

# Freedom and Constraint in the Creative Process in Digital Fine Art: An AHRB Invited Workshop

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### ABSTRACT

The workshop will explore in depth the nature of freedom and constraint in the creative process in digital fine art from the perspective of embodied mind. The problem is crucial to our understanding of the creative process in fine art. The aims and objectives of the workshop are to bring into visibility critical insights into the creative process, thereby potentially empowering digital artists.

### Categories and subject descriptors:

J Arts and Humanities J.5 Fine Arts

**General terms:** Human Factors, Theory, Design.

**Keywords:** Creativity, freedom, constraint, consciousness, digital fine art.

### RESEARCH CONTEXT

A paradigmatic change is now occurring in our conception of what it is to be a human being in the world, and how we come to understand things and act in innovative and creative ways. Lakoff and Johnson [1] in their book 'Philosophy in the Flesh: the embodied mind and its challenge to western thought' emphasise that the mind is inherently embodied. They stress that thought is mostly unconscious; and that abstract concepts are largely metaphorical. They discuss in detail how the body and the brain shape reason, contrary to traditional Western Philosophy which sees reason independent of perception and bodily movement. The authors acknowledge their indebtedness to Merleau-Ponty and his embodiment theory of perception. However, unlike Merleau-Ponty, they do not examine the importance of the interaction with materials and the role of technique in helping to shape consciousness.

Merleau-Ponty represented cognition as embodied action, and art as enriched being produced primarily not by intentional acts, but by the reciprocal influence of consciousness, the body, techniques and materials. In the 'Phenomenology of Perception' Merleau-Ponty [2] argues that our fundamental knowledge of the world comes through our bodies' explorations of it. The body is not primarily a thing observing the world and being informed by its motivational and emotional state. Instead, primary meaning is reached through co-existing with the world in distinction to intellectual meaning which is reached through analysis. Primary meaning is brought about mainly by pre-reflexive thought in distinction to reflection. The body has its world or understands its world without having to use its symbolic objectifying function, '...to perceive is to render oneself present to something through the body' and 'consciousness is in the first place not a matter of 'I think', but of 'I can' (p 137). Meaning is not found pre-existent in the world, but called into existence by bodily activity, with inter-subjectivity resulting from the communality of the body.

Scattered throughout the writings of Merleau-Ponty is an embodiment theory of art, which he uses to support his embodiment theory of perception (Haworth [3]). This views the artwork as 'enriched being' in its own right, as distinct from an analogue for an external truth or essence, as traditional aesthetic theory claims. It 'gives visible existence to what profane vision believes to be invisible' (Merleau-Ponty [4] p 166). It contains 'matrices of idea' and symbols whose meaning we never stop developing (Merleau-Ponty [5] p 77). Merleau-Ponty [6] claimed 'that modes of thought correspond to technical methods, and that to use Goethe's phrase, 'what is inside is also outside' (p 59). As Merleau-Ponty indicates, we do not see the world, but see with the world. In artistic terms, different media with which we interact have different voices, which play a part in the creation of enriched being, perception and consciousness.

This fusing of thought and action is critical to the creative process. In the posthumous publication 'The Visible and the Invisible' Merleau-Ponty [7] viewed his theories as incomplete. He indicated that one of the areas destined for review was a study of the imaginary, 'which is not simply the production of mental images, but the baroque proliferation of generating axes for visibility in the duplicity of the real' p lii. A recently concluded AHRB project by Haworth (Innovation Award B/1A/AN649/APN13706) studied the interplay between mind, body and electronic technology in fine art ([www.creativity-embodiedmind.com](http://www.creativity-embodiedmind.com)). The project shows that the process of exploration with the computer in making digital art prints generates and reveals possibilities and visual experiences, as well as speaking to initial expectations. The process of exploration becomes a vehicle for seeing which is influenced by the technology. Visual explorations undertaken with the computer can influence what one 'sees' in the world, what comes into focus and what demands attention, influencing what is recorded experientially, mentally, and digitally. In turn, this influences further explorations with the computer. Artistic vision is constantly reshaping itself in interaction with the world, including technology, geographical place, culture and events. The Innovation Award project also highlighted the potential importance of studying freedom and constraint in the creative process. As variations on images can be produced extremely rapidly in digital art, selection is necessary. This can involve a 'feel' for the image, against an overarching concern, which itself may have taken years to emerge and be still unfolding. It generally involves a deep knowledge of the art world. Thus both 'actor centred' and 'veridical' decision-making are intertwined in the process of selection. The computer enhances freedom for exploration, but also contains within it the potential tyranny of continual choice, though artists can apply constraints, intuitively or otherwise. Johnson-Laird [8] argues that freedom of choice occurs par excellence in acts of creation, but that the set of choices is constrained by largely tacit mental criteria that determine the genre, shared by other practitioners, and the individual style.

Digital fine art encompasses a vast range of practice, much of which is not concerned with the physical art object (see Christiane Paul [9] for an excellent review). Many artists, however, are 'Interrogating the Surface' at the interface between traditional printmaking and digital techniques. Scanners can input textures, parts of etchings, lino and woodcuts, paintings, and photographs etc. Images and other information can be downloaded from a variety of recorders as well as digital cameras, videos, and the internet. These can be combined with other materials or images stored in the computer, and manipulated using sophisticated commercial software packages, and a pressure sensitive pen on a graphics tablet. The result can be outputted to a range of sizes and types of printer and on to a wide variety of materials to form original digital art prints in single or multiple formats or incorporated into multimedia installations. Outputs can be

used in further processes to produce traditional prints, such as etchings, screenprints, lithographs, photogravures, or be incorporated into glass and ceramics etc, or to produce three dimensional surfaces and objects through sophisticated industrial tools and rapid processing techniques. A continual loop can be established in this interrogation of the surface. This has produced art works of great inventiveness and aesthetic sensibility. Personal gesture and 'feel' for materials continue to be significant in the digital age. However, multimedia forms of delivery increasingly shape our perception of the visual world. Technology can stimulate changes in thinking, and play an important part in the transformation of culture (see Christiane Paul [10] p 212). There has also been extensive research into computer support for artists, and how well the technologies meet the creative requirements of artists. The endeavours of artists at this interface have encompassed the visual and philosophical relationships between art, science and technology, to produce vigorous, stimulating artworks. Dynamic interactive techniques also enable the viewer to have an active role in creating or changing the art object. Together, these approaches continually challenge the understanding of visual language, and aesthetics. They provide many ways in which digital art can carry the aesthetic signature of the artist. They also raise the challenge of new concepts of originality and ownership.

#### **WORKSHOP**

A small-group day seminar will be held to investigate in depth the nature of freedom and constraint in the creative process in digital fine art from an embodiment perspective. As freedom and constraints can reside in the person, technology and society, the workshop will include all three areas in the investigation. The workshop will also be cognisant of considerations of the imaginary. Approximately twenty-five people from a range of disciplines will be invited to participate. There will be sufficient notice given for participants to undertake investigations on the topic. First person methods of research are now strongly advocated (e.g. Varela and Shear eds. 'The View from Within' [11]). In this case the method consists of 'listening to the voices' emanating from the practice of digital fine art and reflecting on the process. A log can be kept of both the technical and thought processes involved in the practice of digital fine art, paying particular attention to the issue of freedom and constraint in the creative process. Recognising that technology and practice are intimately intertwined (see for example, special edition: 'Technology as Skilled Practice': Social Analysis, [12]) the log could also be open to insights into the forms of interaction between technology and perception, and the nature of imagination. Alternative approaches are welcome, as are theoretical presentations from a variety of disciplines.

The aims and objectives of the workshop are to bring into visibility critical insights into the creative process, thereby potentially empowering digital artists.

### ABSTRACTS OF PAPERS FOR THE WORKSHOP

The following section contains examples of a presentation and abstracts of papers for the workshop.

#### John Haworth

##### Digital Print Making

Working with the computer provides an enormous leap in exploratory power. Using commercially available software packages, variations in colour, contrast, brightness, tone, line, texture, pattern, sharpness and size can be achieved rapidly. Using the zoom facility the surface of an image can be interrogated at different levels, often revealing visual aspects not previously brought to attention. Images can be cropped and explored further. Through the use of filters a vast array of changes can be made to parts or the whole of the image. Brushes can be individually designed to make marks with specific characteristics. In addition, the body can be brought more fully into the process to produce more autographic effects by the use of a pressure sensitive graphics tablet. Bodily actions and artefacts can be captured and transformed, establishing new sets of relationships between the two. The use of layers can incorporate different overlays of facets of the previous aspects to see how they compose, and layers can be made to interact in different ways. Images can be easily blended, distorted and transmuted. Many unexpected effects can occur, which is considered central to the creative process (Johnson-Laird, [13]; Simonton, [14]) These unexpected effects can be considered, and those of interest saved as stimulus points for possible further work.

In the process of interaction with the digital medium artists can apply constraints, intuitively or otherwise. A particular range of prints may use a limited range of filters, with which one feels more comfortable, but for which one is still finding new potentialities. At the same time this can be interlaced with rapidly trying out other filters, even if many results are not saved. The parameters chosen to work with have been restricted further to, for example in the case of Coldwell, black and white dots, mechanical lines and photographs of objects, but still providing great freedom as each pixel can be modified. Limits on the size of readily accessible printers can encourage work of a certain size, which may be appropriate for the particular imagery. But the opportunity to explore the potential for larger images may also enhance creativity. Yet this needs to recognise that images and marks are not the same at different sizes, and that while large format prints can be explored in the computer, the final test is in the proofing. This may suggest the necessity for initial mark making at a different scale with different tools and images. Limits on digital storage capacity can reinforce the discipline of

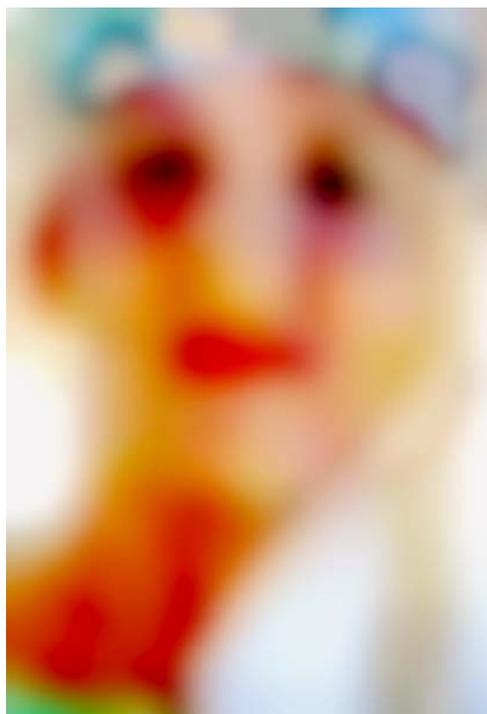
examining and reviewing images, which can be done relatively quickly.

My creative practice making digital art prints uses a wide range of materials, computer software, and printers from small to large format. Printmaking is my chosen medium because of the potential it offers for the exciting exploration of delicate surface properties. The digital print medium, with its fine surface quality and potential to incorporate and transmute imagery, I find particularly attractive as a conduit for the idea of vibrant transience. This I explore while probing the pixels and listening to the voices emanating from the medium. The work has been exhibited internationally. Examples can be seen at the British Council Digital Art 2003 at [www.digital-art-x.netfirms.com](http://www.digital-art-x.netfirms.com) During this practice I keep a log of both the technical and thought processes involved. This was referred to in a paper I presented at a panel on Research into Art and Technology at an international conference on 'Creativity and Cognition' at Loughborough University in October 2002, and which is published in the conference proceedings. Notes are kept on the interaction with the medium, and on the development of the work and emergent meanings. An account of this follows in relation to two prints.



**'Fragmenting Square':** This print was made shortly after the tragedy of September 11<sup>th</sup> in the USA. However, it drew on elements which had been worked on before that date, and imagery that emerged afterwards. It is composed from four prints done separately, but with an overarching concern. These were: fading edge, fragmenting edge, broken edge, and fallen square. Some of the material and imagery in these prints came from scanned textures and colours I had made

using turpentine on printing inks on large pieces of paper, making marks with broad palette knives. Other imagery was from the light of the sun setting on water on a harbour front, the surface of which was whipped by the wind. Some of the colours and lines came from front page pictures of the September tragedy. A previous edge print I had done was about the contrasting sharp glow of life in the Arizona desert. The fragmenting square was in-part about the break up of this. When the four prints were put together and printed the image looked uninspired compared with each of the individual images. The combined image was altered using the auto-levels and equalise functions, and the gaussian blur filter which helped to combine and change some of the shapes, while at the same time integrating them. The contrast function was then used to reduce most of the blur which seemed excessive in this print. Various areas of the print were then selected and colours changed. As is well known, the square has been an important element in the work of modernist artists searching for pure form and beauty, and absolute truth and meaning. The post modern age questioned the viability of this. September 11 saw further crumbling of the certainties. But perhaps the print contains delicate potentials for growth and relationships.



**'Dancer: Head'** This started as a digital photograph I took of a belly dancer at a village fair in Tunisia. Her dress was predominantly yellow, with green, red and white sections. The colour was vibrantly enhanced by the bodily movement. In the computer the photo was examined and cropped down to the figure. This was blown up to life size and explored. At first the figure had been more appealing. But the head called

for further examination, and the image was cropped and saved as an alternate. To get away from the very particular face, and attempt to make the image more 'universal', the 'posterise' and 'gaussian blur' filters were used. The tones on the head-dress were altered. The shape of the head was changed slightly to see how the image looked at 58 x 85 cm, which was the maximum image width I had been working with on a HP 500 design jet printer, and which sat nicely in a 70cm x 100cm beech frame. Using 'contrast' and 'variations' filters, different strengths of yellow were explored, the main colour of the first visual sensation of the dancer, and Tunisian red was added. Considerable effort was made to save in the corner of the image some of the bright green from the dress. Several tonal variations of the image were printed and tried in the wooden frame. Whilst the palest image looked insubstantial out of the frame, it looked the best in the beech frame, drawing from and resonating with the wood. The Tunisian red enhanced this. The print seemed to echo the proud, colourful striving of Tunisia and its people in the context of economic difficulty. The print has both a fragility and strength resulting from the use of the digital medium, pertinent to the subject. In particular, the moire patterns formed by the gaussian blur filter amplify the vibrant transience at the particular size of the framed print. Arguably, the overall presence of the print would be unobtainable by means other than the digital medium. Since producing this print, several large format prints have been made of other images, facilitated by the AHRB award. Examining work on the original head of the dancer, as part of an editing review of images, the head was taken up to large format. What at first sight at a smaller scale had seemed to be blotchy imperfections became interesting in their own right at this larger scale, particularly when examining the print at a distance of about four or five feet, dissolving the head into an abstract. At a greater distance the image was obviously that of a head. Overall, the print began to approach a vibrant edge on the cusp of form and attractiveness.

This description of my creative practice in digital print-making supports the claim made by Merleau-Ponty that the art work is enriched being produced by the reciprocal influence of consciousness, the body, techniques and materials. The log of the creative process also gives a feeling for some of the freedoms and constraints operating. An 'idea', for example, if well articulated, may give some organising force to interaction. In this case a feeling for 'vibrant transience' may resonate with particular potentialities of the digital medium. However, the idea may be influenced by personal history, and shaped by geographical place, culture and events. Expression of the idea is also influenced by past traditions in art and by current opinions and opportunities, whether these are supportive or conceived as challenges to overcome. Csikszentmihalyi [15] proposes a systems view of creativity emphasising the importance of the inter-relationship between society, culture and the person. The enforced discipline of reviewing work can reveal that some recent work, or work in progress, may

not appear as good as something done previously in the same area. At the same time, opportunities for previous work to be taken further can emerge in the light of more recent work. Creativity and imagination are thus not operating linearly, but rather back and forth. Simonton [16] proposes that creativity can be viewed as a constrained stochastic process; that is something which is characterised by conjecture and chance (stochastic) but is not totally random or capricious, instead is constrained. Creativity involves learning the skills of the domain. Yet as Simonston argues, the multidimensional and configurational nature of the creative product (the interaction of different aspects) makes it extremely difficult for the creator to learn what reliably works. He also notes that the creative domain defines constraints; and that creators cannot judge the value of their works in isolation from the rest of the world. A continuing log of the creative process in digital print-making is being maintained. Further insights from this will be reported at the workshop.

### **Sue Gollifer**

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### **Digital Developments**

The values and meaning associated with the roles of the 'artist' and the 'audience', are experiencing profound challenges and undergoing substantial shifts within a wider contemporary discourse. In part, this a direct result of the growth of digital technologies throughout the social body and the increasing digitisation of daily life and historical experience. It has led substantially to a redefinition of culture in contemporary terms and to posit new models for a hybridised, virtual existence and to generate provocative creative statements - utopian, dystopic or pragmatic - for a digital era.

In August 2004, as Art Gallery Chair'04 I curated the SIGGRAPH Art Gallery Show *Synaesthesia*.

### **QUOTE**

"This year's theme Synaesthesia demonstrates how artists can excite and stimulate the senses using technology to create art that ranges from low-tech digital plotters to high-end computer graphics and animation. It also features work from both well established and younger contemporary artists."

*Synaesthesia is the phenomenon in which the stimulation of one sense modality gives rise to a sensation in another sense modality. The term "synaesthesia" originates from the Greek syn (together) and aisthesia (perceive). The most prevalent form of synaesthesia is "hearing" music or vowels in color.*

The exhibition showed work by visionary artists in all areas of digital art that stimulated the senses, including 2D, 3D, interactive techniques, installations, multimedia,

telecommunications, screen-based work, and computer animation. The viewers to the Art Gallery were encouraged to see, hear, and touch the art.

I am also the curator of **ArCade** the UK's Open International Exhibition of Electronic Prints. This provides an opportunity to see a wide range of recent original, limited edition, artists' prints, which at some stage in their production have involved the use of computers to generate and/or to manipulate their imagery. The most recent ArCade IV travelled extensively throughout the UK and Denmark in 2003-4. A major retrospective of ArCade will be held in the State Museum in Novosibirsk in April 2005.

The use of digital imaging makes this an exciting, challenging, and innovative time to be an artist/printmaker. It also encourages a major reevaluation of printmaking processes in general, raising the issues of authenticity and ownership and blurring the distinction between 'original' and 'reproduction'. It is now ten years since I conceived of the original idea of ArCade. My initial intention behind the exhibition was to demonstrate to art and design academics and students the potential of using new technology to create, on the one hand a new print medium and on the other a hybrid link between both old and new technology. In the early 1990s, when I saw this potential, there was little evidence of shows or articles to which students could refer. Since then significant advances have been made in the area of computer generated imagery. It has now developed into a printmaking medium in its own right. It is also used in other hybrid forms, to create links with more traditional print processes, such as Screen-printing, Lithography and Etching, where it is used either to generate ideas or to produce laser prints for photographic stencils; thus allowing a bridge to develop between old and new technology. This also permits a distinction to be recognised between computer graphics, an area of work which by its nature is readily reproducible and highly visible to the public, and the less frequently seen digitally-generated fine art print, which has presence, texture and status as a physical image.

### **James Faure- Walker**

[www.dam.org/faure-walker/index.htm](http://www.dam.org/faure-walker/index.htm)

### **Painting through Digital Eyes**

Painting with the computer is a complex and little understood subject. Surveys on 'digital art' have neglected the continuing development and dominance of contemporary painting, which was supposed to fade away like an underachieving technology. This has not been my experience as a painter, a digital artist, or writer on art. The thesis of my book ('Blink: Painting through Digital Eyes' Addison Wesley 2005) is that painting is a living and adaptable art form, capable of absorbing advances in computer graphics, with one or two adjustments in the way we think about it

'Digital fine art' is a confusing term in my case, because I cannot see that painting becomes a different creature just

because it is wholly or partially digitised. In other words painting remains painting, whether pre-digital, digital, or post-digital, and the 'creative process' with all its blocks, diversions, anxieties and releases, is much the same. On the micro scale of pictorial elements there is the difference that you can be 'free' with geometry and constrained forms. But if I paint a red circle on a blue ground it really is not critical whether I use Illustrator, Painter or oil paint, or all three. I could make it 'constrained' using a compass, or make it a bit off, drawing it freehand. The trick is probably doing it so you don't think about how it has been done. That was just as true before anyone thought of a frame buffer.

The more interesting questions are to do with the whys and wherefores of making the circle in the first place. Some might say that painting, as a format for digital invention, is too 'media thin' to compete with an immersive/multimedia CAVE installation. Such installations have been described as 'delivering' an aesthetic experience, or even *the* aesthetic experience. You could say painting doesn't merit 'cutting-edge' attention, or research funding, as a delivery system. And yes, the position statements, the array of projectors, the tomes from MIT and Leonardo, the powerhouse set-up of ZKM, are all impressive. But the content? Have I ever felt liberated, danced or burst into song, tears or laughter, after such experiences? No. But I confess to have done all that after seeing incredible paintings.

I have not yet been convinced that any piece of digital art - algorithmic, interactive, virtual, web - is inherently superior as art just *because* it is digital; nor that it plays more directly on my consciousness or seriously advances art. When I have been impressed it is because of its characteristics as art, not because of its digital innovation. At computer shows such as Siggraph, at which I regularly exhibit, the hardware, the 'emerging technology' gains that prize. 'Digital art' as a category dissolves when 90% of art students are PhotoShop users. We have to move beyond the 'New Media Replace Old Media' fantasies of the nineties. During the period that new media art has been promulgating position statements, 90% of the most striking new art has found its inspiration elsewhere. To speculate about the digital and the creative process, if there is just one process, it is wise to keep track of the less openly 'digital'. Perhaps the best digital art won't look digital at all.

### **Paul Coldwell**

#### **A Layered Practice**

This paper will consider, through the author's practice, the role of the digital in the production of print based artworks. It will focus on research made within the University of the Arts research project, FADE, 'The Fine Art Digital Environment; Surface, Layering, Memory', formally 'The Integration of Computers within Fine Art Practice' ([www.camberwell.arts.ac.uk/research](http://www.camberwell.arts.ac.uk/research)). It will refer to artworks that have been presented at the following

exhibitions, Computers & Printmaking (Birmingham Museum & Art Gallery 1999), Interrogating the Surface, (Atkinson Gallery 2001), Digital Responses (V&A 2002), Case Studies (Queens Gallery Delhi 2002) and Beyond the Digital Surface (Ewha Korea 2004).

Developing out of training in traditional printmaking, the paper will discuss how this physical engagement with 'making' impacts on decision making when working with digital technology. This includes a number of hybrid practises where both forms of working are exploited to produce the final artwork. Notions of scale, presence, layering and surface will be considered when explaining the thought process behind particular artworks and the author's need for the subject matter to determine the final output. The paper will also discuss how, through the digital, photographic and autographic, languages have become fluid, and the potential this holds for new meaning.

### **Tom Kemp**

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#### **Writing and art**

I am no writer. I am an artist Writing on art is therefore always going to be a complex business for me. The only way I can justify this particular essay is due to a definition of art which recently occurred to me. It sums up my problems with art's relation with writing. For a while I have been deriving an abstract painting technique from the movements of handwriting. The original attempt was somehow to capture or pounce on writing, a strikingly reticent phenomenon. Writing is what we use to explain everything else. Turning it on itself always just creates more of the very stuff being studied. Make a copy, even, of a letter E, and you always end up with a brand new E, not a copy in any normal sense. Despite an excess of theoretical work on writing, its physical reality is never assessed. Writing is necessarily *made*. It is that necessity which intrigues me. Endless rehearsal and repetition with a wide range of materials and tools has taken me closer to writing itself than any amount of reading.

Working with a computer was initially just an obvious experiment to try a new set of graphical tools. However, these are often so slick that they can mimic real-world tools to an unnerving degree. For me, using an on-screen brush as if a real brush turned out to be a mistake. I had to alter my understanding of the relationship between virtual tools and the physical instruments I had to wield in order to make the tools create significant marks. However, it was a surprisingly quick process to re-engineer my bodily movements to cope with the relationship. The reward came when it became clear that here was a way to create new, otherwise unrealizable tools, materials and surfaces. Indeed, the meaning of 'tool' itself was now open to redefinition, hence also the meaning of 'making'. Working digitally forced an issue for me. Abstracting ever further from 'real' writing took me to the conclusion that writing is the canonical method of recording

our very being. This has led to some very fruitful work. However, there is a limit to abstraction. There is a point or boundary where it stops being clear how art can explain writing. The strange thing is that art does continue to provide such an explanation well beyond this cut-off. At such a point I made the following discovery. Art is inexplicable understanding.

Pursuing corollaries of this two-word definition will last me for the rest of my career. It at least allows me, via a convoluted argument, to introduce writing back into my work, not as exegesis, excuse or theory but as one more tool with which to make art. As a consequence, writing is once more at my disposal as a legitimate tool in the effort to understand writing itself.

**Jon Pengelly**

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### **New topologies of practice**

Artists and designers oeuvre is increasingly mediated by an array of computer hardware and software solutions, with the personal computer and 'off the shelf' drawing / modelling software packages now firmly established amongst more traditional means of visualization, belying distinctions we might try to make between the result of digital and/or haptic drawing processes. Further, advances in 3D computer imaging: object scanning, computer-aided-design, together with developments in *custom-manufacture* resulting from rapid prototyping and rapid manufacturing technologies, increasingly blur the distinctions we might choose to make between an objects form in any physical or digital sense.

This paper describes research, which sets out to investigate the enormous potential of these technologies to create new creative opportunities for artists to engage or interfere with the resulting aesthetic, functional, cultural and ergonomic mechanisms of both manufacture and consumption. This research builds on the author's practice and earlier AHRB funded research *Developing artworks using computer-aided-design technology: towards establishing an innovative three-dimensional visual syntax within printmaking*. The development of a more appropriate art and technology / manufacturing syntax, whilst critically examining the role artist printmakers might play in this emerging language of 'unique-mass production', has obvious consequential implications for the cultural meanings we might seek to infer or invest in the art object itself.

The work described in this paper seeks to subvert both established 'design through making' route[s], most familiar to artists engaged in the iterative craft of making (term used in its expansive sense), and also by short-circuiting the strong underling representational mode[s] imposed by off-the-self software solutions, towards a simultaneous or even spontaneous 3D digital creative practice. This paper will discuss examples, which specifically engage with the

underlying tools, systems, material [s] and manufacturing technologies resulting in work, which alludes to a fundamentally emergent inherently tacit digital creative practice.

Additional presentations will be made at the workshop.

### **CONCLUSIONS**

Digital fine art manifests a diversity of practice, in which the fusion of thought and action is critical to the creative process. Technology influences perception and thinking; while at the same time concepts, ideas, and feelings influence the use of technology. Random happenings in the process of making art are critical to the creative process, enhancing freedom of choice. In turn, however, choice can be tyrannical, if it is not embedded in constraints, which may originate from the individual, group, and society. Johnson-Laird [17] argues that the paradox of creativity leads to the view that there are many criteria on which the creator must rely and that by no means all of them are available to overt inspection. Some of these are common to many practitioners, and constitute the genre or paradigm. Other criteria are unique to individuals, and constitute an individual style of thought within the more general framework. Merleau-Ponty [18] in his writings on the embodied nature of creativity and consciousness emphasises that an artist's style is not something developed consciously in order to depict the world, but is an 'exigency that has issued from perception' p 49. It is a personal system of equivalencies that the artists make for themselves for the work, which manifests the world as they see it: 'it is the universal index of the 'coherent deformation' by which he ( the artist ) concentrates the still scattered meanings of his perception and makes it exist expressively' [19] This can be seen in the material in this workshop. It supports an emphasis on diverse experience and training in the life of artists, coupled with an ability to retain an open perspective while at the same time recognising the importance of operating within certain parameters, even if these change over time. Csikszentmihalyi [20] argues that creativity is the product of three main shaping forces: a set of social institutions, or *field*, that selects from the variations produced by individuals; a cultural *domain* that will preserve and transmit the selected new ideas or forms to the following generation; and the *individual* who brings about some change in the domain which the field will consider to be creative. Abuhamdeh and Csikszentmihalyi [21] consider that the *field* has a perpetual need for novelty, and that as a result the field's aesthetic preference is guaranteed to change constantly. The field includes all the individuals who act as gatekeepers to the domain, including art critics, art historians, art dealers, art collectors, and artists. Arguably, digital art and its practitioners are expanding the range of ideas and forms considered acceptable by the field; while at the same time broadening and democratising the field (see Christiane Paul [22]). Part of this process may be an intuitive recognition that creativity is not a search for absolute unchanging truths, but

ideas and forms in which we can come to rest provisionally, with inter-subjectivity resulting from the communality of the body.

## REFERENCES

1. Lakoff, G., and Johnson, F. *Philosophy in the flesh: the embodied mind and its challenge to western thought*. New York: Basic Books, 1999.
2. Merleau-Ponty, M. *Phenomenology of perception*. London: Routledge and Kegan Paul, 1962.
3. Haworth, J.T. Beyond reason: pre-reflexive thought and creativity in art. *Leonardo* 30, 2, (1997), 137-146.
4. Merleau-Ponty, M. The primacy of perception, in J.M. Eddie. (ed.) *The primacy of perception*, Evanston: North Western University Press, 1964.
5. Merleau-Ponty, M. Indirect Language and the Voices of Silence' in J.Wild, ed *Signs*. Evanston, IL, North Western University Press. 19--).
6. Merleau-Ponty, M. *Sense and nonsense*, Evanston: North Western University Press, 1964.
7. LeFort, C. (ed.) *The visible and the invisible*, Evanston: North Western University Press, 1968.
8. Johnson-Laird, P.N. Freedom and constraint in creativity, in R.J. Sternberg (ed) *The nature of creativity: contemporary psychological perspectives*. Cambridge: Cambridge University Press. 1988 pp 202-219
9. Paul, C. *Digital Art* London: Thames and Hudson.2004
10. Paul, C. [9] p 212.
11. Varela, F.J., and Shear, J. *The view from within*. Thorverton, UK: Imprint Academic, 1999.
12. Technology as Skilled Practice. Special Edition. *Social Analysis*. March, 1997.
13. Johnson-Laird [8]
14. Simonton, D.K. Creativity as a constrained stochastic process, in R.J. Sternberg, E.L. Grigorenko, & J.L. Singer (eds) *Creativity: from potential to realization* Washington, D.C. American Psychological Association. 2002 pp 83-101
15. Csikszentmihalyi, M. Society, Culture and Person: a systems view of creativity, in R.J. Sternberg (ed) *The nature of creativity: contemporary psychological perspectives*. Cambridge: Cambridge University Press.1988 pp 325-339.
16. Simonton [14]
17. Johnson-Laird [8]
18. Merleau-Ponty [5] p 49
19. Merleau-Ponty [5] pp 51-52
20. Csikszentmihalyi [15]
21. Abuhamdeh, S., and Csikszentmihalyi, M. The artistic personality: a systems perspective, in R.J. Sternberg, E.L. Grigorenko, & J.L. Singer (eds) *Creativity: from potential to realization* Washington, D.C. American Psychological Association. 2002 pp 31-42
22. Paul [9]

## POTENTIAL TOPICS FOR DISCUSSION AT THE WORKSHOP

The nature of freedom and constraint in the creative process in digital fine art.

The relationship between technology, perception, imagination, and aesthetics.

The making of meaning and the meaning of making.

Individual, social, and cultural influences on creativity in digital fine art.

Working between a digital and a physical studio.

Still the still image?

Drawing and computer vision.

Evaluation.

## FURTHER READING AND INFORMATION

Creativity and embodied mind in digital fine art. DVD. Record of an AHRB seminar, London 2002. Obtainable from D&AW 10 Heaton St. Blackburn, Lancs BB2 2EF

Digital Surface-CDROM- ISBN 1 870225 96 Produced in conjunction with University of the Arts London, UIAH Helsinki, and NCAD, Dublin 2003. Obtainable from Research at University of the Arts, London.

Case Studies.Catalogue for Paul Coldwell Solo exhibition. Essays by Anthony Rudolf and Paul Tebbs- ISBN 0-9537974-1-4 London:London Print Studios 2002. Obtainable from Research at University of the Arts, London

Faure Walker, J. How digital and traditional mediums can work together. *Artists and Illustrators* July 2003. pp. 22 - 25

Faure Walker, J. Combining Digital Art and Painting. *Artists and Illustrators* January 2005.

Gollifer S. *SIGGRAPH 2004 Electronic Art and Animation Catalogue*, Computer Graphics Annual Conference Series. ACM SIGGRAPH. 2004

Gollifer,S ArCade IV - Artists Space, *Digital Creativity*: Volume14 Number 3, 2004, pp 243-265.

Threinen-Pendarvis C. *The Painter 9 Wow Book*. Berkeley: Peachpit Press. 2005

Wands, B. *Art in the Digital Age* London: Thames and Hudson. 2005.