THE FIRST INTERNATIONAL CONFERENCE ON TRANSDISCIPLINARY IMAGING AT THE INTERSECTIONS BETWEEN ART, SCIENCE AND CULTURE

New Imaging: Transdisciplinary strategies for art beyond the new media

Conference Proceedings

Edited by: Associate Professor Su Baker and
Associate Professor Paul Thomas

The first International Conference on Transdisciplinary Imaging at the Intersections between Art, Science and Culture.

Edited by
Su Baker Victorian College of the Arts
Paul Thomas University of New South Wales
Publication Compiled by Julian Stadon Curtin University

Review Panel:
Ross Harley, Julian Stadon, Brogan Bunt, Leon Marvel, Ted Colless, Mark Titmarsh, Brad Buckley, Daniel Mafe, Brogan Bunt, Kathy Cleland, Justin Clemens, Lloyd Barret, Erica Seccombe, Ernest Edmonds, Martyn Jolly, Julian Goddard, Petra Gemeinboek, David Thomas

Published by Transdisciplinary Imaging Conference 2010
Sydney, Australia

ISBN: 978-0-9807186-6-9
ISBN Agency – Thorpe Bowker
Level 1, 607 St Kilda Rd Melbourne VIC 3004

Supported By

Partners

Sponsors

INTRODUCTION 4

The Un-paintable Image: Gerhard Richter, Ethics and Representation 5
Darryn Ansted Curtin University of Technology 5

Visualising Matter and Cosmologies: An Example Based on a Transhistorical Approach 15
Lucia Ayala Humboldt University of Berlin / Granada University 15
Dr. Jaime E. Forero-Romero Cosmology Group, Astrophysical Institute Potsdam.....15

Projecting the Audiovisual Object 21
Lloyd Barrett Queensland University of Technology.....21

Seeing Like a Robot: Augmented Reality Vision 30
Kathy Cleland The University of Sydney 30

Take a Good Hard Look at Yourself: *Autoscopia* and the Networked Image. 40
Justin Clemens University of Melbourne.....40
Adam Nash RMIT 40

Iconicity: the Medium of Miraculous Images.....52
Edward Colless Victorian College of the Arts 52

Zwischenräume: The Machine as Voyeur 63
Petra Gemeinboeck College of Fine Arts, UNSW 63
Rob Saunders University of Sydney 63

Compumorphic Art - The Computer as Muse 72
Dr Ian Gwilt Sheffield Hallam University 72

Painting in Transit: A re-mapping of painting's changed terms of reference. 77
Stephen Little National Arts School, Sydney.....77

Imaging affect: abstraction and the echo of the unknowable.....82
Dr. Daniel Mafe Queensland University of Technology 82

Syzygy: gazing at shadows, darkly.....91
Harry Nankin.....91

New Imaging: Transdisciplinary Strategies For Art Beyond The New Media.....103
Gavin Perin University of Technology Sydney.....103
Linda Matthews University of Technology Sydney.....103

The Transdisciplinary Potential of Remediated Painting.....112
Anne Ring Petersen University of Copenhagen.....112

***GROW*: Visualising Nature at Nanoscale.....126**
Erica Seccombe, Australian National University.....126

Contemporary Hybrid Painting: The Aesthetics of a Post-Medium Condition.....132
Dr Mark Titmarsh.....132
University of Technology, Sydney 132

After the Screen: Array Aesthetics and Transmateriality 140
Mitchell Whitelaw University of Canberra 140

INTRODUCTION

A profound shift is occurring in our understanding of postmodern media culture. Since the turn of the millennium the emphasis on mediation as technology and as aesthetic idiom, as opportunity for creative initiatives and for critique, has become increasingly normative and doctrinaire. Mediation and the new media arts have in fact become the new medium of critical and pedagogical discourse: like water is for fish, like culture is for cultural studies, mediation is a concept that is taken for granted now because it is itself the medium in which we think and act, in which we swim. We need a concept that is amphibian, and that can leave its medium. The concept we propose is a remediated apprehension of the image: an active image and activity of imaging beyond the boundaries of disciplinary definition, but also altering the relations of intermedia aesthetics and interdisciplinary pedagogy. This concept will need to incorporate a vibrant materialism of the image's sensory and cognitive strata and an evanescent immaterialism of its affective qualities. Rather than locate our conference in the space of negotiation between disciplines or media (the "inter-"), we propose the opposition, transit and surpassing of the interdisciplinary by a "transdisciplinary aesthetics", and its conceptual and physical practice of a "transdisciplinary imaging."

The aim of the conference is to bring together artists, scholars, scientists historians and curators.

The conference will explore areas related to: Painting, Drawing, Film, Video, Photography, Computer visualization, Real-time imaging, Intelligent systems, Image Science.

Participants were asked to address at least one the following areas in their abstract:

- remediated image
- hypermediacy and the iconic character of the image
- politics of the image and/or image making in a transdisciplinary context
- life sciences and bioart in relation to the living image
- distributed and networked image
- table top scale to nano
- machines and computer vision
- perspectival image
- image as speculative research and critque
- illusion, process and immediacy
- aesthetics and the proliferation of imaging

Keynote Addresses

Roy Ascott, Jens Hauser and Anne Ring Petersen

The Speakers Chosen Were:

Andrew Frost, Daniel Mafe, Darryn Ansted, Douglas Kahn, Edward Colless, Erica Seccombe, Harry Nankin, Gavin Perin, Ian Gwilt, Justin Clemens, Adam Nash, Kathy Cleland, Leon Marvell, Linda Matthews, Lloyd Barrett, Lucia Ayala, Mark Titmarsh, Mitchell Whitelaw, Oron Catts, Petra Gemeinboeck, Stephen Little, Jaime E. Forero-Romero, Gavin Perin, Rob Saunders.

The Un-paintable Image: Gerhard Richter, Ethics and Representation

Darryn Ansted Curtin University of Technology

Gerhard Richter encounters an ethical quandary when painting historical subjects relating to National Socialism and the Holocaust. His seemingly effortless movement between diverse styles and motifs collapses when attempting to paint Holocaust victims, Nazis, and Adolf Hitler. The responsible ethical representation of these subjects seems to be one that resists their unproblematic depiction for circulation in an economy of signs. It is a quandary that recalls Theodor Adorno's notion that lyrical poetry is impossible after Auschwitz.[1]

In the late 1960s Richter wanted to paint photographs of concentration camp victims beside pornographic images but felt that he ethically could not do so. However, the original photographic sketches for this project remain in his catalogue of source material, *Atlas* (*Atlas Sheet 16-20*, 1967).[2] The project came to an abrupt halt and yielded a specific un-paintable image, creating a unique situation that allows detailed analysis of the complexity of this difficult subject of representation.

In order to understand Richter's decision, Slavoj Žižek's discussion of Hannah Arendt's text, *Eichmann in Jerusalem: A Report on the Banality of Evil* (1963), is instructive.[3] Arendt wrote the text after covering the Adolf Eichmann war crimes trial in Jerusalem for *The New Yorker*. The infamous trial revealed how easily catastrophic consequences can ensue from the mere following of orders. Žižek agrees with Arendt's rejection of the idea of a sublime evil. He concurs that the notion of the Nazi as a kind of "evil genius" is misguided.[4] As Žižek states: "Nazis were not the kind of heroic picture-heroes of evil," that is not to say "that the Nazi evil was something banal; it is that the executors of this evil were ordinary persons. Banality of evil doesn't mean that evil was just a banality," rather, that the Nazis were "simply ordinary."[5] This is echoed in Richter's resistance to the characterisation of the Nazi as evil genius, for example through juxtaposing Nazi figures such as the Nazi doctor Werner Hyde with banal and even kitsch images.

Žižek argues that the evil was generally committed by the average bureaucrat who was following orders, as Arendt implies, but he goes further. For Žižek, these bureaucrats were not *merely* following orders. Instead, he suggests that they enjoyed following horrific orders as a kind of "sexual perversion."[6] He proposes that their pleasure "arises from tension between the performative

---

1 Theodor W. Adorno and Rolf Tiedemann, *Kulturkritik Und Gesellschaft* (Frankfurt, Main: Suhrkamp, 1977).30.

2 Jürgen Harten, "The Romantic Intent for Abstraction," in *Gerhard Richter Paintings 1962-1985*, ed. Jürgen Harten (Cologne: DuMont Buchverlag Köln, 1986).

3 Hannah Arendt, *Eichmann in Jerusalem. A Report on the Banality of Evil* (New York: Penguin Books, 2006).

4 Slavoj Žižek and Glyn Daly, *Conversations with Žižek* (Cambridge, UK; Malden, MA: Polity; Distributed in the USA by Blackwell Pub., 2004), 127.

5 Ibid.

6 Ibid.

instrumental activity and the secret obscene way it is enjoyed."[7] He suggests that the Nazis secretly "knew that the rituals of duty were a pretence to disguise the enjoyment derived from doing something horrible – even the guilt feelings generated here served to enhance their pleasure."[8] Richter's project would have underscored this conceptualisation of the horrors of Nazism – that it was underpinned by the same banal drives that are invested in pornography.

The fact that Richter did not paint images from death camps, but that the plans to do so remain in *Atlas* (*Atlas Sheet 16-20*, 1967) beside pornographic images (*Atlas Sheet 21-23*, 1967) (Figure 1) strikes a position between the perverse-banal evil suggested by Žižek and the un-representable image along the lines of Adorno's imperative. The link between the banal and the cataclysmic suggests that unchecked, the basic drives within civilisation produce the fetishised dehumanisation of the human other and in the superlative form of the Holocaust, this ought to be the vanishing point of symbolic representation in painting.

Figure 1 Gerhard Richter, *Photographs from Books*, Atlas sheet 16, 1967. 66.7 x 57.1cm.

During his early years as an artist in West Germany, Richter limited himself to photographs as source material for paintings. However, Holocaust photography has a different status to the amateur photography that he usually used. Photographs of events associated with the Holocaust also have a different status to paintings related to the Holocaust. Holocaust photography is the subject of a large discourse with much at stake. Most obviously, the photograph's role of historical documentation distinguishes it from the painted image. On this point, the work of different documentary photographers who worked in Germany after

7 Ibid.
8 Ibid., 128.

the war has been seen as more or less sensitive to the suffering of victims. Some images are more sensitive, showing only two or three starved and tortured figures, their faces staring at the viewer; others seem more anaesthetic, images of masses of dead bodies, more distant from the viewer and with whom a direct relationship with the viewer is less emphasised – but these are perhaps better able to indicate the colossal scale of the genocide. The photographic images in Richter's *Atlas* span both ends of this spectrum. Painting this subject however would have required Richter to take a resolute position on this spectrum; perhaps a decision that he found unbearable or unethical to make.

Perhaps the anonymity of the subjects contributes to the quandary of representation in this unpaintable image. The *painting* of images of people who are anonymous Holocaust victims generates a perplexing question of responsibility. Richter's decision indicates he believes the responsible representation of the already dehumanised anonymous Holocaust victim is, after all, impossible. This is in contrast to his paintings of other victims of unrelated disasters, such as the eight student nurses who died in a fire in *Eight Student Nurses* (1966). This unpaintable image suggests that the anonymous victim of institutionalised genocide is a figure who throws the artist into question to such an extent that deferral is the only possible response.

Richter's withdrawal from this unpaintable image is a carefully framed silence. It comes not only after painting a wide variety of a subjects and styles but also after working through preparatory sketches, wherein he applied ink to the source reproductions of the Holocaust photographs. This explored ways in the project might have progressed. However, to then suddenly cease at this point specifically manifests an unpaintable space between codes and signifiers of representation that Richter otherwise confronted enthusiastically. As such, a crisis of ethics occurs within the otherwise fluent visual language of the oeuvre. This breaching of language and shock immanent within language itself rather than described by that language is the ghostly hole to which other ruptures in the oeuvre can then be related.

Richter's painting *Aunt Marianne* (1965) that depicts his maternal aunt, Marianne Schönfelder also relates to this ethical quandary. His intellectually disabled aunt was murdered under the Nazi party's October 1939 'Aktion T4' policies to euthanize the infirm. As she was part of Richter's extended family, she was not an anonymous statistic and thus painting her image does not seem to pose the same problem of ethical representation that Richter experienced with painting unknown victims of the Holocaust. By painting her holding him as an infant, together on a blanket, this closeness is emphasised.

Figure 2 Gerhard Richter, *Aunt Marianne,* CR 87, 1965. Oil on Canvas, 120 x 130cm. Photo: www.gerhard-richter.com.

The painting *Hitler* (1963) (Figure 3), which Richter destroyed shortly after having made, is also related to this ethical quandary. It is a clear, flat, stencilled image of Adolf Hitler. The figure is shouting over the left shoulder of the viewer in an imposing pose although it is painted in a deadpan Pop Art style. It seems to have been based on a still from the Nuremberg address although it has been slightly laterally compressed as though re-photographed (perhaps from a television screen) from a three quarter position.

The representation of National Socialism by Richter's generation of artists is a subject of emotionally fraught discourse. One verifiable fact is however that painting unsettles viewers when connotative qualities of the image are confused with denotative qualities. Markus Lüpertz used motifs such as Wehrmacht helmets and officers' caps in his artwork from 1970 to 1974. Siegfried Gohr noted that Lüpertz "entered the path towards a redefinition of his painting, by facing up to the greatest emotional barrier, the taboo of silence imposed on the Nazi period, and breaking through it with his German motifs."[9] However, the artwork caused controversy because the use of such symbols was seen by many as *too* similar to their use by the Nazis.[10]

Jürgen Harten has pointed out that the Berlin Group took a similar approach to that which Richter used in *Hitler* (1963). They painted political figures in the mid-1960s (Figure 4), sought to be critical and political and reject the neutrality of history painting.[11] Its leader, Ulrich Baehr, started an early contemporary artist

[9] Siegfried Gohr and Markus Lüpertz, *Markus Lüpertz* (Barcelona/New York, NY: Ediciones Polígrafa/D.A.P., 2001).

[10] Dorothea Dietrich, "Allegories of Power: Markus Lüpertz's "German Motifs"," *Art Journal* 48, no. 2 (Summer 1989): 164. "Considering the subject matter and the method of production, it is not surprising that the critical reception of Lüpertz's German Motif paintings has been mixed. Interestingly, it was the German conservative press that particularly decried the paintings as fascistic and neo-Teutonic; others, however, have seen them as courageous attempts at addressing the German past"

[11] Harten, "The Romantic Intent for Abstraction," 58, 24f.

run space in Germany, *Galerie Großgörschen 35* and the Critical Realism movement *Berlin Kritischen Realisten*.[12] However, Richter's treatment of *Hitler* is not as loose and expressive as that of Baehr. It is much more restrained and objective, in keeping with his deadpan transcription of images circulating in the media. Richter does not completely demonise nor alienate the figure in the painting, which problematises the reading of Hitler as an evil mastermind. His image is flattened out and placed on a deadpan gestural grey background causing the image to appear banal.

The usual sense of inconsequence associated with Pop, which, by contrast is present in Warhol's flat, colourful Mao paintings, is absent in Richter's painting of Hitler. In Richter's early oeuvre the image has a place alongside images of toilet paper, antler horns and a portrait of Lassie. However, the iconographic power of *Hitler* casts a shadow over these other banal subjects. It is too strong for the dampening effects of Pop representation. It is the shadow of the banal paintings and imbues them with a gravitas they would not otherwise have. While the disjunctive string of images foregrounds the "banality of evil" about which Hannah Arendt wrote in that same year, and the dampening has been attempted, the image was too inextinguishable, too powerful to be allowed to remain in existence. It is paintable, *all too paintable*. It represented Hitler as too easily assimilated, which this time called for the radical erasure of the image and upholding of a silence punctuating Richter's movement through codes and signifiers, made and unmade. Although this time unmade completely it still casts a shadow over the oeuvre even after its destruction.

Figure 3 Gerhard Richter, *Hitler*, CR 3, 1963. Oil on Canvas, 110 x 130cm, Destroyed. Photo: www.gerhard-richter.com.
Figure 4 Ulrich Baehr, *Sportpalast*, 1966. Distemper on Canvas, 128 x 108cm, Galerie Poll. Photo: www.poll-berlin.de.

In general, Richter dampens difficult subjects by using the partial erasure and concealment of the blur. A painting cannot be blurred in the same way as a photograph and the term should be understood here to mean an effect created by dragging a brush through the still wet surface of the painted image. This has the effect of making the (un-) depicted subject felt. Richter's portrait of his uncle in Wermacht uniform, *Uncle Rudi* (1965), based on a family photograph, is one example. Benjamin Buchloh suggests it images a confrontation with a previously

[12] Ibid.

"unrepresentable subject of history" for the immediately post-war generation.[13] Dragging a brush through wet paint produces a soft focus blur in the painting.

Figure 5 Gerhard Richter, *Uncle Rudi*, CR 85, 1965. Oil on Canvas, 87 x 50cm, Lidice Gallery, Lidice, Czech Republic. Photo: www.gerhard-richter.com.

Richter uses the "blur" variously to obfuscate, to indicate when something cannot be represented and to make the depicted subject felt as well as seen. This does not necessarily depend on the fact that the consciousness of the viewer is irrevocably shaped by the advent of photographic accidents.[14] Blurring generally is a very old technique that has been used to desacralise a painting. For example, after initiates of various Australian Aboriginal tribes have finished their initiation ceremony the paintings on their bodies are blurred to dampen their mythic power. This means the paintings are no longer sacred/dangerous and can be viewed safely by ordinary people. That is, the sacred codes have been made banal.[15] When painting on canvas, early Papunya Tula painters blurred the painting with dotting. While this was an ideal means of concealing dangerous and often secret designs, it both camouflages and simultaneously registers a presence, which can never be known only felt. Richter's subjects also have an iconographic power that makes them taboo and he too evokes a presence of the unseen by developing a ghostly quality through the act of blurring.[16]

Richter's phenomenal "destructive acts" interrupt the artwork, and allow for the possibility of something other than intention, volition or ego to comprise the painting. The "destructive moment" occludes the viewer's gaze and renders the image less threatening. The subject is blurred, de-sacralised, othered, made banal and thus becomes observable. However, the result is a blur that also has

[13] Benjamin H. D. Buchloh, "Gerhard Richter: Painting after the Subject of History" (Ph.D. diss, City University of New York, 1994), 78.
[14] Rosemary Hawker, "Blur : Gerhard Richter and the Photographic in Painting" (Ph.D. diss, University of Queensland, 2007).
[15] Geoffrey Bardon, *Papunya Tula : Art of the Western Desert* (Ringwood, Victoria: McPhee Gribble, 1991), ix-x.
[16] Ibid.

an autonomous status like the ghost or presence of the figure that interrupts the here and now and casts a shadow even after its erasure.

In *Uncle Rudi* blurring visually distances the figure but makes its actual presence more felt.[17] The figure is difficult to dismiss outright as Richter depicts Rudi's awkward smile addressing the viewer, betraying boyish pride, servility and naivety. This casts Rudi's generation of soldiers as also victims, as family, fathers and uncles, who were killed or became pariahs on their homecoming, kin rather than strangers. However, the frontal, monochrome composition somewhat alienates the figure. The viewer is compelled to register the trauma, of both his victimisation and his potential crimes.

Richter's ethical quandary is better understood with recourse to the theorist, Emmanuel Lévinas.[18] According to Lévinas, the human other cannot be entirely known and understood by the subject and is inaccessible to epistemology. He argues for the importance of the question of how to have an ethical exchange rather than the question of explaining the phenomenon of others. Maurice Blanchot worked with Lévinas and describes this approach in *The Unknowable Community* (1983):

> "An ethics is possible only when – with ontology (which always reduces the Other to the Same) taking the backseat – an anterior relation can affirm itself, a relation such that the self is not content with recognizing the Other, with recognizing itself in it, but feels that the Other always puts it into question to the point of it being able to respond to it only through a responsibility that cannot limit itself and that exceeds itself without exhausting itself."[19]

Accordingly, Lévinas locates the subject in relation to the other person. He argues that the presence of another can place the being of the subject into question and thereby open the possibility for ethics. The other can arouse the *shameful* response in the subject (about which Jean-Paul Sartre wrote) but the other can also prompt a response of responsibility for the other.[20] Lévinas emphasises this point by substituting the other for God. This shifts the tone of the phenomenology, breaks it free from ethical relativism and aligns it more with ethical absolutism. For Lévinas, the other, even in the simple form of the first encounter of the infant with the nursing mother, gives the human being self-

---

17 Buchloh, "Gerhard Richter: Painting after the Subject of History", 83.

18 See Emmanuel Levinas, *Totality and Infinity : An Essay on Exteriority*, Duquesne Studies. Philosophical Series (Pittsburgh: Duquesne University Press, 1969), 33. Lévinas writes "A calling into question of the Same which cannot occur within the egoistic spontaneity of the Same – is brought about by the Other. We name this calling into question of my spontaneity by the presence of the Other ethics. The strangeness of the Other, his irreducibility to the I…, to my thoughts and my possessions, is precisely accomplished… as a calling into question of my spontaneity, as ethics. Metaphysics, transcendence, the welcoming of the Other by Same, of the Other by Me, is concretely produced… as the calling into question of the Same by the Other, that is, as the ethics that accomplishes… the critical essence of knowledge.".

19 Maurice Blanchot, *The Unknowable Community*, trans. Pierre Joris (New York: 1988).

20 See Martin Jay, *Downcast Eyes* (Berkeley and Los Angeles: University of California Press, 1994), 551. Jeff Malpas explains how Lévinas makes this leap from other minds to the otherness of God in Jeff Malpas, *Place and Experience: A Philosophical Topography* (New York: Cambridge University Press, 1999), 80. Lévinas believed the "face-to-face encounter" with the other has an infinite character that cannot be summarized by ontology.

consciousness and not vice versa. As such the other represents alterity that is absolute and in Jacques Derrida's terms, this interrupts the presence of being.

Lévinas's theory helps to explain Richter's quandary of ethical representation of an anonymous Holocaust victim. Richter's strategies of erasure and obscuring of the figure as in *Uncle Rudi* or *Aunt Marianne* culminate in partial occlusion of the image of the figure and an autonomous aberration that makes the presence of those figures felt. Similarly, Lévinas forms a humanist "philosophy of the other" characterised by deferral.[21] His book *Totality and Infinity* (1961), published in the same year that Richter moved from East Germany (Dresden) to West Germany (Düsseldorf), insists that the other is transcendental and absolute, existing without and beyond the subject, and that only this realisation could address the perspectivalism inherent in all prior Western European ontology. Lévinas believes that ontology failed to acknowledge the "absolute alterity" of the other, akin to Richter's artwork suggesting that perspectival representation fails to acknowledge the absolute alterity of the other.

Jolanta Nowak relates the artwork of Gerhard Richter to the thought of Lévinas in her doctoral thesis *Critical Ethics: Contemporary Art and Art Criticism in the Light of Lévinas' Ethics*.[22] In general, Lévinas, like Plato, believed that representation cannot responsibly stand in for the other. Nowak argues that Richter attempts to make images that *can* responsibly stand in for the other, particularly in his sensitive depictions of his wife breastfeeding their child. I argue this extends to Richter's decisions *not* to paint. In particular not to paint the image of anonymous Holocaust victims, but also his decisions to entirely destroy his painting of Hitler and to iconoclastically distort images related to National Socialism.

Derrida's discussion about ethics and otherness also sheds light on Richter's oeuvre. Derrida argues that the other emerges in a crisis of ethics that occurs within the language system itself. Claude Lévi-Strauss argued, following Lacan who proposed that the "unconscious is structured like a language," that society was "structured like a language," and speaks through social organization. In his theory, otherness was the necessary opposition for the identification of subjects. Derrida's emphasis on undecidability (the impossibility of deciding between orders of meaning) and *différance* (language's difference and deference to meaning as it moves from sign to sign in the linguistic chain) complicates the presence of being.[23] He suggests that the absolute nature of the alterity of the other, the alterity immanent in the available logical structures, is not a structure available to structuralist language except in a phenomenological capacity. It is this phenomenological interruption that culminates in various disturbances in Richter's oeuvre.

---

[21] Levinas, *Totality and Infinity : An Essay on Exteriority*, 63.

[22] Jolanta Marie Nowak, "Critical Ethics : Contemporary Art and Art Criticism in the Light of Lévinas' Ethics" (Ph.D. diss, University of Melbourne, 2006).

[23] Jacques Derrida, *Positions*, ed. C. Norris, trans. A. Bass, Second ed. (London & New York: Continuum), 5-6.

Richter's otherwise unflinching exploration of styles is a staging of modernism as a flattened grammar. He specifically pierces this visual language with a Derrida-like, post-structuralist positing of otherness as a crisis of ethics emerging in the structure of language. His transposition of modernism into a grammar (rather than a steadfast subversive ideological posturing), which is punctuated with erased or occluded subjects, withdraws from the authorial mode where formerly the modernist artist's speaking voice gave the viewer a fixed perspective. This way of working empties the modernist icons of their iconographic power. It creates a perspective oriented toward difference itself, more than toward different things. It is a sensibility oriented toward that which cannot be represented, rather than that which can be easily painted.

Derrida argues that there is no "transcendental signified" and thus the alterity of the other is only apparent in the breaching of language and destabilisation of hierarchical structuring.[24] Richter's oeuvre searches for this *différance*; the slippages and fissures evoked by moving between visual codes, the breaches of the linguistic chain; the destructive negation left in a state of becoming-aberrant alongside its formative moment. These ruptures phenomenologically destabilise seamless imbrications between codes and signifiers, shattering modernism's discourse of otherness and postmodernism's infinite relationality like a mirror.

Richter's succession of images has the tight internal logic of a language system, yet also has the inversions, fusions, slippages, and shadows of a language game. Most importantly, it has ruptures that, I argue, align with one key caesura. By establishing an unpaintable image, a silence in the oeuvre, a painting prepared but never executed of anonymous Holocaust victims, Richter's work alludes to that which lies behind the symbolic realm.

When a succession of images is interrupted, ruptured, or an individual image is punctured, smeared, partly destroyed, or even entirely destroyed or stillborn, an alterity that is neither fixed nor located comes to inhabit the oeuvre like a ghost, which challenges the notion of visibility, presence and the priority of the artist's action. Gerhard Richter's oeuvre is registers an echo, an immanent otherness and a shadow that never can be fully visible.

[24]———, *Of Grammatology*, 1st American ed. (Baltimore: Johns Hopkins University Press, 1976), 50.

References.

Adorno, Theodor W., and Rolf Tiedemann. *Kulturkritik Und Gesellschaft*. Frankfurt, Main: Suhrkamp, 1977.

Arendt, Hannah. *Eichmann in Jerusalem. A Report on the Banality of Evil*. New York: Penguin Books, 2006.

Bardon, Geoffrey. *Papunya Tula : Art of the Western Desert*. Ringwood, Victoria: McPhee Gribble, 1991.

Blanchot, Maurice. *The Unknowable Community*. Translated by Pierre Joris. New York, 1988.

Buchloh, Benjamin H. D. "Gerhard Richter: Painting after the Subject of History." Ph.D. diss, City University of New York, 1994.

Derrida, Jacques. *Of Grammatology*. 1st American ed. Baltimore: Johns Hopkins University Press, 1976.

———. *Positions*. Translated by A. Bass. Edited by C. Norris. Second ed. London & New York: Continuum.

Dietrich, Dorothea. "Allegories of Power: Markus Lüpertz's "German Motifs"." *Art Journal* 48, no. 2 (Summer 1989): 164-170.

Gohr, Siegfried, and Markus Lüpertz. *Markus Lüpertz*. Barcelona/New York, NY: Ediciones Polígrafa/D.A.P., 2001.

Harten, Jürgen. "The Romantic Intent for Abstraction." In *Gerhard Richter Paintings 1962-1985*, edited by Jürgen Harten. Cologne: DuMont Buchverlag Köln, 1986.

Hawker, Rosemary. "Blur : Gerhard Richter and the Photographic in Painting." Ph.D. diss, University of Queensland, 2007.

Jay, Martin. *Downcast Eyes*. Berkeley and Los Angeles: University of California Press, 1994.

Levinas, Emmanuel. *Totality and Infinity : An Essay on Exteriority*, Duquesne Studies. Philosophical Series. Pittsburgh: Duquesne University Press, 1969.

Malpas, Jeff. *Place and Experience: A Philosophical Topography*. New York: Cambridge University Press, 1999.

Nowak, Jolanta Marie. "Critical Ethics : Contemporary Art and Art Criticism in the Light of Lévinas' Ethics." Ph.D. diss, University of Melbourne, 2006.

Žižek, Slavoj, and Glyn Daly. *Conversations with Žižek*. Cambridge, UK; Malden, MA: Polity; Distributed in the USA by Blackwell Pub., 2004.

Visualising Matter and Cosmologies: An Example Based on a Transhistorical Approach

Lucia Ayala Humboldt University of Berlin / Granada University
Dr. Jaime E. Forero-Romero Cosmology Group, Astrophysical Institute Potsdam

Abstract
We propose a visual dialogue in terms of cosmic matter and structure formation between cosmology in contemporary astrophysics and Cartesian tradition. More precisely, we take the system of vortices in Descartes' physics and connect them with the simulations of large-scale structure being performed nowadays. The comparison is drawn through different visual levels: starting with the representational one; followed by the analysis of the theoretical systems behind them; and, finally, paying attention to their function and materiality as visual productions. A skilled use of image analysis proves to be a fundamental tool to stress the continuities and peculiarities between different epochs and disciplines.

Keywords
Cosmology; Descartes; simulations; structure formation; matter visualisations

> "La gran lección filosófica de la ciencia contemporánea consiste, precisamente, en habernos mostrado que las preguntas que la filosofía ha cesado de hacerse desde hace dos siglos –las preguntas sobre el origen y el fin– son las que de verdad cuentan." (Paz 2009: 179).

The Dutch artist and mathematician Frans van Schooten the Younger (1615-1660) visualised the system of vortices for Descartes' "Principia Philosophiæ" in 1644. In 1989 the astrophysicists Melott and Shandarin published in "The Astrophysical Journal" the results of their simulations to visualise large scale structure. These two images are very similar and, at the same time, are radically different. In the following pages we propose a multilayered dialogue to understand the reasons for such similarities and differences.

Shattering motion and Big Bang – Cosmos as history
In "Le Monde", Descartes proposed a theory explaining the *formation* of the cosmos, but not its *origin*, because it was assumed to be a creation of God. He supposes an already created matter "that should be imagined as the hardest and solidest body existing in the world" (Descartes 1644 [1989]: 132). At a given moment, God started to shake this compressed matter. The shaken parts divided themselves, triggering the motion and subsequent division of the closest ones in a kind of "chain reaction." As a result of this primordial shattering motion, the matter acquired the most diverse forms, "like pieces exploding when a stone is broken" (Descartes 1644 [1989]: 136).

This Big Bang-like picture is consistent with the contemporary observational framework of physical cosmology, where the Universe in the past is understood to be more homogeneous, denser and hotter than it is today. However, the processes concerning the asymmetry between created matter and antimatter, or

the origin and nature of the initially low density inhomogeneities (the seeds of present time galaxies) do not have yet a standard theoretical picture confirmed by observations.

Fluid medium – Subtle matter and dark matter

Descartes used the concept of subtle matter, a fluid composed of particles in constant motion. One of the main contributions of his model was the introduction of the *visualisation of matter* as a key factor in astronomical images. Its penetrable nature, subjected to constant change and interactions, was depicted by dotted surfaces. In doing so, special consideration was given to the *quality of matter as essence of the model*. When other authors popularised the Cartesian model only this dotted surface was highlighted. The visualisation of cosmic matter and how it forms the general structure, started to be more important than concrete phenomena or mathematical laws. This became a distinctive visual feature of Cartesian physics, even in abstract figures. As a consequence, the traditional way of presenting astronomical diagrams (considering only orbital trajectories and the position/organisation of bodies) was enriched with the depiction of cosmic matter. A remarkable example comes in the comparison between the diagrams of the Tychonic and the Cartesian systems, as appeared in an English translation from 1761 of the “Conversations on the Plurality of Worlds” by Fontenelle, where in addition to the concentric circles delineating the orbits, there are dots filling the gaps between them. From then on, it was not possible any more to conceive a diagram without attracting attention to the matter as one of its main elements, since it was an essential factor in the formation of structures.

This logic of representation remains until today. The first physically accurate representations of large scale structure formation models, obtained through computational experiments, highlight as well the role of matter visualisations. In the scientific papers, matter distribution is depicted also with dots, representing particles that are not of a physical nature (in the sense of particle physics), but of a computational one. This discretisation of matter into particles is a necessary step to perform the calculations, even when the physical model corresponds to a fluid. These particle-based models implemented first in modern supercomputer simulations in the 1970’s still remain nowadays. In spite of that, their graphic representation evolved significantly with the available plotting software that triggered a new kind of rendering, closer to the postulated fluid nature of the matter being simulated. In the images from the Millennium Simulation performed by the Virgo Consortium at the Max Planck Institute for Astrophysics in 2005, dots spread out into different shades and hues, with colour palettes evocative of the imagined nature of dark matter. Comparing this kind of image with the versions in the seminal papers of the field, where the particles are clearly depicted as dots, one can confirm that the higher degree of sophistication in the visual language allowed the visualisation of more information. If the Millennium Simulation were represented by dots, all the nuances in the filaments, voids and

knots would disappear, being reduced to a black smudge. Nevertheless, the basic topological information of the cosmic web is contained in both cases.

Structure formation – Halos and vortices

Dark matter, the dominant matter component in our Universe according to contemporary physical cosmology, is not compatible with the framework of particle physics. It emerges as a consequence of our conceptual understanding of gravitation: the equations describing its behaviour correspond to a collisionless fluid that only interacts through gravity. In other words, currently the behaviour of dark matter cannot be described from basic principles of particle physics (a dark matter particle has not been detected yet) and, therefore, the only available approach is through its gravitational effects; to fully explore these effects numerical simulations are required.

We have mentioned the differences between the renderings of the first large scale structure simulations and the most recent ones. It is important to assert, that the main consequence of this sophistication of visual language due to the improvement in hardware and software, was the possibility to observe the emergence of new structures inside the cosmic web, namely high concentrations of dark matter with shapes close to spherical and having a spinning motion. These concentrations are called halos, and play a fundamental role in galaxy formation models.

In these models, all galaxies are placed inside a dark matter halo, gravitationally attracted to other ones. Because of this attraction, they can collide and merge. As a result, the galaxies inside can fuse, transforming its morphology: a larger galaxy is formed out of two smaller ones. For instance, the Milky Way and Andromeda, our closest disk companion, are expected to merge in five billion years from now. The resulting shape is expected to be spherical, instead of a disk; the structure changes in this merging process. This is the base of the hierarchical picture of galaxy formation, where structures grow from the merging of smaller ones. Their host dark matter halo traces in turn the cosmic web.

This modern chronicle once more echoes Cartesian physics. According to it, matter is composed of particles in motion revolving round several centres. This behaviour forms different systems or vortices, each one described as “a heaven that spins round the star” (Descartes 1644 [1989]: 140). The vortices are also labelled as “large heavens”, being “very unequal in size” among each other (Descartes 1644 [1989]: 226). Due to being liquid, their shape is supposed to be oval. The heavenly bodies are placed in the middle of the vortex to which they belong. This interplay between heavenly bodies and vortices recalls galaxies and halos in contemporary conceptions.

Taking this point further, the vortex dynamics also mirrors the hierarchical merging of halos. The Cartesian particles are by definition constantly moving. As a consequence, they collide among each other provoking different results:

erosion or fusion. In any case, this collision changes the structure of the matter. For that reason, many vortices disappear and their respective centres (the heavenly bodies) come closer to the nearest ones, forming new structures. Each satellite of Jupiter, for example, is considered the remains of an ancient more complex system, whose original structure was lost due to collision. When their respective contexts vanish, the satellites come close to the nearest body, in this case the planet, and are integrated to it forming a new vortex.

Images and simulations shaping large scale structures

Frans van Schooten was entrusted with the task of visualising the system of vortices theorised by Descartes; both together gave the *tourbillons* a shape. In 1989 Melott & Shandarin published a series of technical papers dealing with the simulation and visualisation of large scale structure. We suggested comparing two images, similar at the representational level. Taking a step further, we have explored their respective theoretical frameworks, finding additional striking similarities. To complete this comparison we will retrace our steps to finally examine some aspects in the materiality of the images themselves.

Both models present a fragment as synecdoche of the whole: the systems cover the entire surface, extending themselves to the borders of it. In addition, the structure is composed of repetitive elements. These two aspects, *fragment and repetition*, visually indicate a wider space beyond that already shown. In other words, what we know about discrete areas of the Universe can be applied to the whole. Taking into account the limitations of the observations, this factor is quite relevant in order to achieve a general valid model.

Superposed borders delimit the vortices and interconnect the systems through shared areas, stressing the penetrability of the fluid medium. Borders do not segregate individualities; they highlight being part of a complex system. In the second example, the visualised computational particles present *filaments* connecting large dark matter concentrations.

Descartes emphasised a *cluster of vortices*, or penetrable, interconnected, and volumetric entities containing structures centred around stars, with their related planets and satellites orbiting around; the contemporary model lays stress on the emergence of a *cosmic web*, or a network of large dark matter filaments interconnecting the most massive galaxy clusters.

For both models, *voids* are important. Descartes neglected the possibility of a vacuum, due to the fact that there are particles of matter everywhere in the cosmos. To make this aspect clear, the triangles originating in the interstices among the systems are covered with dense dotted surfaces. For the dark matter model, voids (the regions with a sparse particle distribution) are important as well from a quantitative and technical point of view.

The main divergence between each image lays in their function. On one hand, the vortices are a *visualisation of a theory*, a visual explanation containing the key ideas expounded by Descartes in the text. In this sense, the engraving is as abstract as the theoretical level itself.

On the other hand, simulations of large scale structure are a direct result of a concrete need to reproduce the available observations. It is an *indispensable tool to verify the theory*; the success of a model derives from what is revealed in the simulation.

The first one visualises the theory; the second one visualises the numerical experiment that will shape the theory. For that reason, they are radically different with respect to the contexts to which they belong.

The process of producing images has changed radically since the second half of the 20th century. Contemporary scientists have a new relationship with the images they deal with. In the specific context we present, the main improvements have been possible thanks to the introduction of simulations as key tools. For the *working astrophysicist*, the value of visually comparing the structures derived from the simulation and the ones from observations, plays a vital role; it escorts the quantitative labor of extracting and comparing detailed statistics.

For example, in one of the figures included in the “Simulations of the formation, evolution and clustering of galaxies and quasars” (Springel u.a. 2005: 629) these two ways of approaching data are contrasted: observation (blue pies) and simulation (red pies). The comparison between these images allows the fine tuning of free parameters in the models. This kind of procedure, as well as preparing mock images of individual galaxies from simulations (how would this galaxy look like as seen with the Hubble Space Telescope?), have become standards today in the study of galaxy formation in an explicit cosmological context. Moreover, these simulations can only be performed with the aid of advanced computer techniques nowadays available; this mediated process, resulting in images, is the basic material to work with.

As images, Cartesian vortices and contemporary large scale structure are quite different from a technical and functional point of view. But conceptually, again, they are quite close. In “Le Monde” Descartes presents the whole explanation of his system as a simulation:

> “For a short time, then, allow your thought to wander beyond this world to view another, wholly new one, which I shall cause to unfold before it in imaginary spaces.” (Descartes 1644 [1989]: 99).
>
> “And my plan is not to set out (as they -the philosophers- do) the things that are in fact in the true world, but only to make up as I please from [this matter] a [world] in which there is nothing that the densest minds are not capable of conceiving, and which nevertheless could be created exactly the way I have made it up.” (Descartes 1644 [1989]: 107).

In order to conceive the new physics he proposes, he starts by setting up the conditions of a certain configuration of matter; then he applies the laws he understands as valid and observes the results into this simulated world. He asserts that the same principles can be applied to the actual world. It is in this comparison or analogy that laies the validity of his system. The same method of shaping theories in physics through simulations is applied today as well.

Conclusions

As an art historian dealing with astronomy and an astrophysicist working with simulations, we must specify we are not presenting artistic projects inspired by astronomy, but scientific productions themselves, that is to say, specific visual materials used by scientists to make science, it being produced by skilled artists, as in the case of the collaboration between Descartes and van Schooten, or not, like in Melott and Shandarin, who created their own visualisations.
But in any case, what is important to stress is the necessity of a deep understanding of the *image* as a crucial component of astronomy; one cannot underestimate its relevance reducing it to a mere “representation” or “illustration”. The specific case of cosmic matter reveals quite well the role of *visualisations*: in the examples we presented, matter is constructed directly *in and through* the image. Advanced techniques to see the cosmic particles were not at Descartes disposal; yet nowadays, we don't have enough techniques to detect dark matter particles. But in both cases the *visualisation* of matter is needed to make the science evolve. Therefore, the slides we have shown are not representations, because the physical appearance of the subject to be supposedly “represented” was and is unknown; but they are significant visual productions of meaning. From this standpoint, an analysis from a renewed art historical perspective, when applied to science, provides an essential tool for understanding its materials in a new way.

References

Descartes, René. *Principia Philosophiæ* (Amsterdam: Ludovicum Elzevirium, 1644).

Descartes, René. *El Mundo. Tratado de la luz* (Barcelona: Anthropos, 1989).

Melott, Adrian L. and Shandarin, Sergei F. “Gravitational Instability with High Resolution,” *The Astrophysical Journal* 343 (1989): 26-30.

Paz, Octavio. "Rodeos hacia una conclusión," in La llama doble (Barcelona: Seix Barral, 2009), 174-203.

Springel V., White S. D. M., Jenkins A., Frenk C. S., Yoshida N., Gao L., Navarro J., Thacker R., Croton D., Helly J., Peacock J. A., Cole S., Thomas P., Couchman H., Evrard A., Colberg J., Pearce F., “Simulations of the formation, evolution and clustering of galaxies and quasars,” *Nature* 435 (2005): 629.

Acknowledgments

We would like to thank Jeff Mann for his linguistic remarks.

Projecting the Audiovisual Object

Lloyd Barrett Queensland University of Technology

Abstract
An appreciation of live performance commonly posits performers and their bodies as central to audience engagement. As expanded cinema practitioners extend film outside the frame and beyond passive linearity, so acousmatic composers have separated the work of the musician from the body and the sound from its source. The introduction of notebook computers to live performance rejuvenated this approach, yet the lack of physicality continues to spark debate around the notion of what constitutes "liveness". In the theories surrounding musique concrète, Pierre Schaeffer and his associates constructed a notion of the sound object as a malleable entity not specifically bound by musical or instrumental tradition, physicality, causality or meaning. Modern digital AV performers work towards a compositional integrity and performative presence by expanding this notion towards a unified projection of sound and image.

Contesting popular ocularcentric notions that serve to pigeonhole digital AV performance as a predominantly visual art, the paper explores the cultural and technological influence of musique concrète on approaches to AV performance. The audiovisual object is defined as a potent representational form for the multimodal extension of artistic expression that can be bound and deployed to enhance live presence in modern digital music performance.

Keywords
audiovisual, performance, acousmatic, electroacoustic

Introduction
Trends towards the integration of media forms have been noticed in scattered academic reflections at least since Marshall McLuhan's publications in the 1960s (McLuhan 1964) and have proliferated with the ubiquity of computer based operation. As a keen observer of these trends Stephen Holtzman states, “an expression is an expression of its time [and also] an expression of the idiomatic nature of the medium by which it is realized” (Holzman 1994). The introduction of digital hardware to live performance has necessitated a shift in how we compose, perform and appreciate live media.

The computer considers all media as numeric data and software exists that makes little to no distinction between media types. An interdisciplinary practice is therefore a natural outcome of computational arts, driving the emergence of a distinct form of artistic practitioner. Drawing inspiration from visual arts, cinema, interaction design, electronic music and acousmatic sound theory, the performing audiovisualist composes and delivers integrated digital media works utilising the synchresis of expressive forms to generate and project meaning in performance.

Much has already been written about the relationship between audiovisual practice and 20th Century visual music. Ian Andrews, theorist and AV artist, prefers to define contemporary audiovisual art as a live performance practice

that, “derives its ‘language’ from... formal compositional structures, of time and rhythm, which are closer to music than to specifically cinematic or visual art codes” (Andrews 2009). Andrew Hill is even more direct in describing audiovisual music as a “composition of sound and image informed by traditions of music in which materials are structured within time [and where] the sound and image are regarded as equal components joined in the context of a work...” (Hill 2010).

Contemporary audio and visual practice also share a material status; the electronic signal in wire, or data (Andrews, 2009). Bill Viola states that the video camera “as an electronic transducer of physical energy into electrical impulses, bears a closer original relation to the microphone…” than the mechanical / chemical process of film (Lander and Lexier 1990). This notion of transducence, a transfer from one energy form to another, is central to any modern digital arts practice where analogue input, no matter the form, is converted to data. The source data can be pre-rendered and streamed or transformed and received in real-time and could be representative of anything at all. The focus ultimately is placed on the signal, not the performer, who engineers the real-time manipulation of data into an aural and visual output. Transducence is also at the heart of electroacoustic music, a form taking its origin from the experiments with acousmatic theory that have quietly revolutionised audiovisual production and performance.

This paper extends on the assertions of Hill and Andrews, examining the influence that musique concrète, acousmatic composition and electroacoustic performance have had on modern audiovisual practice.

Instantiating the Audiovisual Object

Emerging approaches to audiovisual performance may draw on the richness of established musical performance practices but they move in many distinct directions away from what might be considered the traditional instrumentalist approach. As expertly summarised by sound artist and composer Darrin Verhagen:

> “Prior to the twentieth century and the development of electronics and recording, there was always a binding between a sonic event and the corresponding action necessary to cause the sound. To make a noise one needed some equivalent movement.” (Verhagen 2009).

With the advent of the recorded medium—the wax cylinder and the phonograph—this binding unravelled. In his Guide to Pierre Schaeffer’s “Traité des Objets Musicaux” Michel Chion (2002) describes the acousmatic approach as “indicating a noise which is heard without the causes from which it originates being seen”. Allegorically inspired by stories of Pythagoras and his akousmats, this approach came at a time when technology allowed for music to be reproduced, away from the musicians who initially created it, via radio, records and tape recorders. As an alternate approach to both sonic perception and

dispersal, the acousmatic approach favoured reduced listening which concentrates on the sound for its own sake, as sound object, independently of its causes or its meaning. In contrast to reduced listening, Schaeffer also described how we commonly try to identify the cause and location of a sonic event (causal) and attempt to understanding its meaning (semantic).

From the experiments carried out by Pierre Schaeffer and his students initially at GRMC (Groupe de Recherches Musique Concrète) and ultimately at INA-GRM (Institut National Audiovisuel, Groupe de Recherches Musicales) an entire movement of electroacoustic music and performance was derived where "visual information, the role of the performer, and instrumental objects are all removed from the acousmatic situation" (LaBelle 2006). The audience gaze shifted to loudspeaker symphonies of acousmatic derivation, where sound objects were engineered and dispersed by the composer in real time and space. The use of loudspeakers produces a "virtual acoustic space into which we may project an image of any real existing acoustic space" (Wishart 1986) or indeed any space of our imagining.

A student of Schaeffer's from GRMC, Pierre Henry, describes Musique Concrète as "...the art of decision. You choose one sound over another; it is the chosen sound that becomes the lodestone of what is to come" (Darmon 2007). When Gene Youngblood defined cinema as "the phenomenology of the moving image" he also asserted "it is important to separate cinema from its medium, just as we separate music from particular instruments. Cinema is the art of organizing a stream of audiovisual events in time. It is an event-stream, like music" (Youngblood 1989).

From a philosophical standpoint, the audiovisual sample as it is used today, bears more than a surface similarity to the sound object outlined by Pierre Schaeffer. Captured in digital form through portable cameras or audio recorders this stream of data is instantaneously separated from its origin, ready for reconstruction and reinterpretation. We split the audio and video data into separate streams to allow for more focused manipulation. We can work at microscopic levels of detail that allow us to extend our regular ability to comprehend the audio or visual event, which variably sits around 24 events per second: the speed of film.

For Malcolm Le Grice, the digital image as data is a powerful form, allowing image reconstruction, transducence between visual and non-visual forms and the construction of virtual realities based on abstract or natural phenomena, through image synthesis (Le Grice 2001). Karlheinz Stockhausen, another student of Schaeffer, prescribed similar affordances in his "Four Criteria of Electronic Music": that sound could be sped up and slowed down; that it could be split; that it could be layered in sonic space; that tone and noise are equally valid sonic forms (Dack 1999).

Media objects in AV work often consist of looped sections of sound and vision, deployed in a structural pattern or stacked to form an audiovisual collage. Harnessing the power of evolving digital technology, electroacoustic tools allow the composer to direct their material towards a near infinite number of stylistic choices. Pierre Henry claims that his sounds are "...all the more alive for being removed from their context. They have a new birth, that I will, and an end that I desire" (Darmon 2007). To borrow a term from the title of a song by German experimental rock band, Einsturzende Neubauten, this is 'Brain-Lego'(1989): short individual clips and long evolving forms that are perpetually broken apart, transformed and reconfigured into new intriguing shapes, thanks to the malleability of data. The manner in which performers bind and project these audiovisual objects is the substance of the remainder of this paper.

Binding Audiovisual Objects

In *Haunted Weather* David Toop describes the dream of "creating an overwhelming synaesthesia" as being subservient to the "false assumptions or deep seated needs [to see a clear] discernible link" between visible actions and sound production that creates a "warm glow of communication" with the audience (Toop 2004). While some of the more hyperbolic references to mixed media work make direct their claims for synaesthesia, it is an incorrect and ineffective holistic descriptor for AV work given the contextual nature of perception. As Mitchell Whitelaw explains, "synaesthesia, by definition, occurs in the perceptual system of a synaesthete, not in the crossed connections of a video synth... Audiovisual works are artifacts; objects of perception, not perceptions" (Whitelaw 2008).

These AV objects often start as a kind of Frankenstein, cobbled together from media parts stolen from their original context. Regardless of their incompatibility, the audience will always process the events unfolding with an eye to understanding them. Whitelaw defines this ability to evaluate and interpret simultaneous event streams in our environment as a cross-modality that "binds percepts into wholes; wholes that map on to ecologically plausible events" (Whitelaw 2008).

Michel Chion reiterates this binding under the term synchresis, or the "spontaneous and irresistible weld produced between a particular auditory phenomenon and visual phenomenon when they occur at the same time" (Chion 1994). Synchresis is a synthesised meaning, through the perception of synchronised or synchretic signals. Where reduced listening focuses on the sound without causal or semantic references, the projection of a sound sample and an image sample together all but guarantees the synthesis of a causal or semantic connection. The question is how can an audiovisual performer capitalise on this quirk?

Trevor Wishart describes electroacoustic composition as the use of sonic metaphor that aims to "unfold structures and relationships in time" (Wishart

1986). These relationships are constructed through the deliberate manipulation of our perception of sound objects and scenes. This method of composition can be readily applied with the inclusion of video as it does not work purely on an acousmatic level nor on a formalised structure level but requires aspects of both combined with our perception and interpretation. In order to more effectively construct a language of relationship between audiovisual objects, Wishart suggests a minimum requirement that has been adapted to include audiovisual objects:

> "recognition of the audiovisual objects and reconciliation of their source;use of formal structures and transformation of the audiovisual objects that have both sonic and visual impact as well as metaphorical importance; ability of the listener to understand the audiovisual metaphors - requires that the composer be articulate and that they build up a set of metaphoric primitives that could be reasonably expected to be understood."
> (Wishart 1986)

With reference to category one, this recognition requires the construction of a metaphoric landscape, a causal relationship between AV objects that might describe a virtual space and the disposition of objects within that space. In Wishart's original text, this relationship extends from the loudspeaker or headphones to be constructed in the listeners mind. With reference to live AV practice the composer is more likely to attempt a transformation or engagement with real space, or the use of real space as a framing device highlighting a transformation. The former will be discussed in more detail in the following section, but it is worth considering the latter here.

Ian Andrews contends that much of what is considered to be contemporary AV performance is "characterised by the synchretic movement of electronic sound and abstract images over time, united at the level of the signal" (Andrews, 2009). He sees the reliance on synaesthesia as a "denial of the more obvious direct causal relations, in favour of a vague confusion of sensory data in the perceiving subject." His belief is that the purest form of AV exists to demonstrate a direct causal relation between audio and video, where the events in one mode are the direct consequence of events in another. (Andrews, 2009)

While the causal relationship between an instrument, performer and sound creation has a physicality that establishes an immediate synchretic presence, the notebook performer projecting their data stream could be an interpretable something or an unparseable nothing depending on how the stream or signal is coded by the performer, decoded by the audience and responded to. Whitelaw explains that in much digital media, the relationship between input and output is imperceptible, obscure or encoded. The data stream by itself is uninterpretable and if the mapping of that data, the process of transducence, is not revealed, the piece will seemingly build on a missing foundation, a magical transubstantiation. (Whitelaw 2008)

An AV work that features this direct causal relationship is projecting the transformation or transducence of causal systems into one another. The performative focus is on the process; however, as per Wishart's requirements, the audience needs only to recognise the causal relationships and appreciate the formal structure(s). In the case of Robin Fox with his laser and synchronator AV performances, we do not need to know that he is directly feeding his sound to the visualisation objects as we can identify a formal process and a causal relationship through his performance. We are also made aware that there is an engineer manipulating these signals and we then assume that this transformation is occurring in real-time as real space is framing a performer and their manipulations. The individual AV elements are made synchretic through the unification of signal, instantiating a causal relationship via the natural process of cross-modal binding. As this binding is synthesised, the audiovisualist can explore alternate combinations, stacked vertically for form, transformed horizontally for meaning. This reliance on demonstrated repeatable synchresis, however it is manufactured, is a key feature of AV works and highlights the point of separation from the Schaefferian school of acousmatic composition.

Projecting Audiovisual Objects

Given the ocularcentric nature of modern society it is understandable that AV is predominantly compared to the mode of cinema and the medium of film. However, Paul Spinrad cautions that "our expectations and habits around being audience members have atrophied ever since movies became popular. [They] taught us to sit together and pay attention to a dead, unchanging recording rather than something living and responsive" (Spinrad 2009). Along with differences in the way film is presented, the moving photographic montage of film responds to a different form of manipulation than the electronic signal of video but this does not necessarily change the expectations of an audience or the way they might perceive that signal. Where audiences identify a performance by the movement of performers, an expectation is readily shattered when the focus of performance is not a human body, but a merging / transforming audiovisual signal.

Ian Andrews argues for a contracted mode of performance where the "adoption of a minimal aesthetic of "static" temporal structures... [combine] with a contracted focus on the medium within a set of defined material limits" (Andrews, 2009). These limits he believes "[shift] composition towards the exploration of material (sonic-optical) possibilities..." and ultimately suggest "the "instrument" and the "medium" are interchangeable (Andrews 2009). The video itself has been used as a way of distancing the performer from traditional performance as well, as Tom Ellard explains: the "visuals distracted from the people on stage. We were against people looking at us 'performing' which seemed a bit 'rock'" (Barrett 2009).

In an acousmatic presentation the body of the acousmatic "performer" is actively involved in the performance, however the focus shifts to the projection or diffusion of a stereo sound to a number of loudspeakers positioned within a

space. The GRM school devised the Acousmonium for this purpose, and composers from the University of Birmingham christened their setup “BEAST”. As Jonty Harrison explains “within the acousmatic tradition... composition and performance are inextricably linked - diffusion being, in effect, a continuation of the compositional process” (Harrison 1999).

For the performing audiovisualist, the composition/performance/projection of sound and image in space is equally conflated. The composer may use software like Max/MSP that works equally for sound and vision in performance. The performer may embrace the use of external controllers, like mixers and MIDI keyboards, which outline a demonstrable link between sound, image and action. The spatial diffusion of sound in space also nicely parallels the urge to project beyond the two dimensional screen promoted by the expanded cinema movement. Audiovisual works have gone from single, to multiple screens, to a mapping of projection onto prepared objects and buildings.

While Wishart declares that the ability for a loudspeaker to “set up a virtual acoustic space into which we may project an image of any real existing acoustic space presents us with new creative possibilities” (Wishart 1986) such a disembodied approach often fails to effectively address the environment to be projected into. As there is no clear link between the sound and its creation, the audience becomes disengaged as the performance could be pre-programmed, the performer just checking their email.

Dealing with the latter issue first, this demonstrates a problem not with the mode of delivery but with the absence of a performing body, in a context that demands presence. As Ian Andrews explains “audiences are drawn by a desire to be in the same space as the artist/composer, and to share a unique event. The emphasis on the role of the performers body in these situations I think is a kind of amplification of presence” (Barrett 2010). David Dixon extends this notion by explaining that “real presence occurs when the artwork demands attention, whatever form the artwork might take. It is content, not container that asserts presence” (Dixon 2007). An acousmatic performance with a distinct focus away from the performing body has every right to be successful, provided the work is sufficiently engaging that it will mesmerise and enchant the attendees. Returning to Wishart’s requirements: projecting audiovisual objects that allow for audience recognition is the first step. Emphasising their clearly defined relationships with one another within an obvious (though not necessarily linear or static) structure is the second step. Producing a connection that, however abstract, could through articulate synchresis be reasonably expected to be understood is a third step.

There is, however, a missing step that relates to how we might address the environment into which we are projecting. The assumption with regards to most acousmatic music is that a concert hall or similar acoustically designed space is being used, providing a (somewhat) clean slate for effective immersion and engagement. With live AV this is rarely the case, as there are few venues

specifically designed for the diffusion of real time spatial audio and video. For this reason the performance is invariably framed by the environment it is presented in, or it aims to transform the environment in some way. Where a process of transduction is being demonstrated, the approach is framed by the space and time it is occuring in, the gestures of the performer (real or figurative) that execute the process, and the bodies of the audience that witness it. Where a number of audiovisual objects are unified in projection then the resultant synchresis tends to replace the performer body as the object of audience focus. As this is a key feature of AV works, careful consideration of how these audiovisual objects interact with the projection environment is therefore the final step required to effectively deliver an electroacoustic performance of audiovisual works.

Conclusion

When we watch a musical ensemble perform, we identify how the individual performers bring forth sound towards a communal whole that we appreciate and applaud in real time and space. When we watch a movie we suspend disbelief and are drawn, trance-like into a narrative explicated through the cause/effect relationship between actors, sets and the structure of scenes. Despite the artificiality of these relationships, we are compelled to understand the interaction of audiovisual objects.

Audiovisualists who consider the acousmatic approach to composition and performance are offered multiple ways to approach audience expectation without relying on traditional film or music interpretations. A strong performative presence can arise from a demonstrated synchresis where care is taken in the selection and distribution of AV objects that form meaningful relationships with each other, with the space and with each audience member.

References

Andrews, Ian. 2009. The Expanded-contracted Field of Recent Audio-Visual Art. *Scan: Journal of media arts culture* 6 (2). http://scan.net.au/scan/journal/display.php?journal_id=134 (accessed 12/02/10)

Barrett, Lloyd. 2009. Email correspondence with Tom Ellard.

———. 2010. Email correspondence with Ian Andrews.

Chion, Michel. 1994. *Audio-Vision: Sound On Screen*. New York: Columbia University Press, 63.

———. 2002. Guide to Sound Objects, ed J. N. Dack, Christine. Place Published: unpublished translation, 11-33. http://modisti.com/news/?p=14239 (accessed 25/02/10).

Dack, John. 1999. Karlheinz Stockhausen's Kontakte and Narrativity. http://cec.concordia.ca/eContact/SAN/Dack.htm#one (accessed 25/02/10)

Darmon, Eric & Mallet, Franck. 2007. *Pierre Henry - The Art of Sounds*: Naxos. (DVD)

Dixon, Steve. 2007. *Digital Performance*, 134

Einsturzende Neubauten. 1989. *Haus der Leuge*. Thirsty Ear. CD

Harrison, Jonty. 1999. Diffusion: theories and practices, with particular reference to the BEAST system. *The Electronic Journal of Electroacoustics* 2 (4). http://cec.concordia.ca/econtact/Diffusion/Beast.htm (accessed 28/09/10)

Hill, Andrew. 2010. Investigating Audience Reception of Electroacoustic Audio-visual Compositions. *The Electronic Journal of Electroacoustics* 12 (4). http://cec.concordia.ca/econtact/12_4/hill_reception.html (28/09/10)

Holzman, S. R. 1994. *Digital Mantras*. Cambridge, MA: MIT Press, 239

LaBelle, Brandon. 2006. *Background Noise: Pespectives on Sound Art*. New York: Continuum International Publishing Group, 30.

Lander, Dan, and Micah Lexier. 1990. *Sound by artists*. Toronto, Ont., Canada: Art Metropole, 49.

Le Grice, Malcolm. 2001. *Experimental cinema in the digital age*. London: British Film Institute, 239

McLuhan, M. 1964. *Understanding Media: The extensions of man.* London: Sphere Books.

Spinrad, Paul. 2009. The Video Injected Hive Mind. *Boing Boing*, http://www.boingboing.net/2009/02/24/the-videoinjected-hi.html.

Toop, D. 2004. *Haunted Weather*: Serpents Tail, 214.

Verhagen, Darrin. 2009. Audiovision, psy-ops and the perfect crime: Zombie Agents and sound design. *Scan: Journal of media arts culture* 6 (2). http://scan.net.au/scan/journal/display.php?journal_id=136 (accessed 12/02/10)

Whitelaw, Mitchell. 2008. Synesthesia and Cross-Modality in Contemporary Audiovisuals. *Senses & Society* 3 (3):259-276.

Wishart, Trevor. 1986. Sound Symbols and landscapes. In *The language of electroacoustic music*, edited by S. Emmerson. London: Macmillan, 43-55.

Youngblood, Gene. 1989. Cinema and the Code. *Leonardo. Supplemental Issue* 2:27-30.

Seeing Like a Robot: Augmented Reality Vision

Kathy Cleland The University of Sydney

Abstract
What do robots see when they look at the world around them? In James Cameron's *Terminator 2: Judgement Day* we see the vision system of the terminator as it assesses its environment and the objects in its visual field with an overlay of computerised information and data analysis. Now, with the increasing proliferation of augmented reality applications on handheld devices like the iPhone and Google's Android phones, 'terminator vision' is becoming a common way of perceiving the world around us. These new prosthetic vision systems, such as Google Goggles and the augmented reality applications Layar and Wikitude, enhance human vision by adding extra layers of data and information to the visual field.
As humans and machines increasingly work together in extended cyborgian systems, it is important to understand the ways that computers see and process visual information both so that we have a better understanding of their strengths and limitations. As Marshall McLuhan reminds us, our technological prostheses and 'extensions' are typically paired with a form of autoamputation. While augmented vision and augmented reality applications offer some exciting new possibilities, we must be careful that we understand their limitations and remain aware of the ways they may diminish as well as augment our perception of the world. This paper argues that we need to make sure that we continue to value and use the full range of our human sensory and cognitive faculties and don't limit ourselves to a robot's-eye view and understanding of the world.

Keywords
Augmented reality; augmented vision; machine vision; diminished reality; distracted reality

Introduction
The technologies we create mediate and shape how we perceive and interpret the world. They can also simultaneously extend and diminish human cognitive and sensorial capacities. Webcams and Google maps, for example, extend our vision and allow us to see people and places that are not in our immediate physical environment. However, these mediated experiences limit our sensorial perception to the audiovisual, removing our other senses and the immediacy of face-to-face perception from the equation. Our perception is simultaneously extended and diminished. We see the world through the glass darkly of our augmenting technologies. This paper investigates how augmented vision and augmented reality systems mediate our experience of the world around us, and the ways they extend, constrain and shape the way we see.

Don Ihde's 'phenomenology of technics' usefully teases out different types of human-technology relationships in terms of what he describes as: embodiment relations, hermeneutic relations and alterity relations. Embodiment relation technologies are "technologies which remain detachable, but which in use are quasi-transparent" (Ihde 2008, 398), such as eye glasses, contact lenses, microscopes and telescopes. The technology may enhance and extend human capacities but the goal is for the technology to functionally 'disappear' so that the

individual feels she is looking directly at objects in the world or is experiencing the world through these technologies. Although embodiment relation technologies mediate our experience of the world they are experienced as an extension the human body—we see and feel the world through them. With hermeneutic technologies, on the other hand, the immediate focus of perception is on the hermeneutic technology itself rather than on objects in the world. In this way, the mediating technology adds an interpretive hermeneutic layer to our perception, and plays a much more obvious and evident role in shaping and constituting how we understand the world around us. Key examples of hermeneutic technologies are written texts, maps, charts and instrument panels. In many cases these hermeneutic representations come to act as stand-ins for the physical realities they represent, in many cases, those physical realities may not be directly accessible or perceptible, for example instrument panels that show radiation levels or aircraft speed. In these cases we rely on our hermeneutic technologies to tell us things that we cannot directly perceive.

Of course, our everyday technology-augmented experience of the world often combines aspects of both embodiment relations and hermeneutic relations. Our physical bodies are extended through the cars we drive, but, safe in their hermetically sealed air-conditioned interiors, we rely on speedometers to tell us how fast we are going, air temperature gauges to tell us how hot or cold it is outside and other control panels that let us know the fuel level and engine temperature. The imbrication of embodiment relations and hermeneutic relations is also strongly evident in human-computer relationships. In Google Maps we can toggle between Street View and Map View and click on hyperlinks giving us more information about specific points of interest. Fed by online databases, computer algorithms and crowd-sourced information, the web is not just a passive technology that we manipulate, it is an active ‘intelligent’ agent, suggesting useful links, images, and information, and recommending books and other consumer items and services. Individuals extend their physical presence into the online realm via avatars and haptic telerobotics enables us to sense and manipulate remote objects in the physical world. In many ways, the term cyborg-relations better explains this type of human-technology relationship. Peter-Paul Verbeek expands Ihde’s terminology to include the category of cyborg relations particularly in terms of different levels of shared intentionality and agency within human-technology relationships. While Verbeek situates ‘cyborg intentionality’ somewhere between embodied and hermeneutic relations, concepts of cyborg intentionality and agency also carry us further towards Ihde’s idea of alterity relations where technology is seen as an independent actor with its own autonomous motivations, modes of perception and understanding. The shared agency and abilities of the hybrid human-machine figure of the cyborg has also become part of the cultural zeitgeist for new forms of augmented vision systems and augmented reality (AR) applications.

“Contact lenses with Terminator vision” proclaims a 2008 article by Telegraph science correspondent Richard Gray, writing about electronic contact lenses that would allow images and maps to be displayed before the wearer’s eyes (Gray

2008). A year later in 2009, a BBC news report announces: “Mobile phones get cyborg vision” (Fitzpatrick 2009) and blog posts along the same lines also proliferate, “Terminator Vision” is here for the iPhone” on slashdot.org and “Google Goggles is Terminator vision for your phone” on spike.com.[1]

As these headlines show, interest in augmented vision systems and augmented reality (AR) applications has hit the mainstream of popular media. Hermeneutic technologies are becoming increasingly embodied in these new forms of augmentation that mediate our perception and interpretation of the world around us. They also highlight a distinctly sci-fi fantasy view of what it might mean for humans to see like cyborgs or robots. What does this desire to ‘see like a robot’ signify? If we see like a robot, what do we gain? What, if anything do we lose?

In James Cameron’s *Terminator 2: Judgement Day* we see the vision system of the terminator as it assesses its environment and the objects in its visual field with a visual overlay of computerised information and data analysis. Now, with the increasing proliferation of augmented reality applications, “terminator vision” is becoming a common way of perceiving the world around us. Unlike earlier sci-fi inspired virtual reality technologies where virtual environments were separate and distinct from the physical world, today’s trend toward augmented reality is one where the virtual and the physical are mixed together and co-present in the same visual field. Today’s augmented reality technologies are being delivered via portable handheld devices such as Google’s android phone and Apple’s iPhone and applications such as Google Goggles and the augmented reality applications Layar and Wikitude. There is also an emerging range of wearable computing devices including glasses and contact lenses as well as MIT lab’s prototype sixth sense technology where users wear mini-computers and projectors can project augmented reality information onto any convenient surface.

We can see augmented vision and augmented reality applications as types of sensory and cognitive prostheses, McLuhanesque ‘extensions’ following in the tradition of earlier technological prostheses of memory, cognition and the imagination such as writing, drawing, photography, sound recording and film. As Andy Clark and Bernard Stiegler both argue there is nothing all that new in our human-technology cyborg natures (Clark 2003, 2008; Stiegler 1998). Today, computers and the internet have become our key prosthetic extensions of memory and cognition, repositories of knowledge and memories, cognitive aids in computation and information processing. Clark’s view of human cognition is characterized by a series of dynamic feedback loops that span brain, body, and world. “It is because we are natural-born cyborgs, forever ready to merge our mental activities with the operations of pen, paper, and electronics, that we are able to understand the world as we do” (Clark 2003, 6).

[1] ““Terminator Vision” is here for the iPhone” posted by timothy, Tuesday August 11 2009, @11:27AM on slashdot.org; and “Google Goggles is Terminator vision for your phone,” posted by bradiger, 8 December 2009 on spike.com.

It is clear that there are considerable benefits to be gained through technological augmentation. But are we also losing something in this process? As a corrective to Clark's cyborg utopianism, it is important to recognise that while human-technology relationships extend and augment human capacities and cognition, they also result in certain losses and constraints. As Marshall McLuhan reminds us that our technological extensions are typically paired with a form of autoamputation (McLuhan 1967). As we extend human capabilities through technological devices, there is a corresponding tendency to offload human functions to those technologies e.g. seeing, thinking, memory and decision-making. Again, this is not a new concern. In the *Phaedrus*, Plato warns of the dangers of using writing as a technological aid to store knowledge and memory, fearing that human memory will weaken and humans will mistake the living truth for its shadowy representation. Our close coupling with augmenting technologies may extend, augment and amplify human senses and cognitive functions, but they may also result in diminished 'space' for human memory, for imagination and reflection as these processes are outsourced to technologies. They may also change the ways our brains work. Research into brain plasticity reinforces the idea of 'use it or lose it' in terms of brain function (Doidge 2008) and a growing number of other writers and researchers are expressing concern over the ways human-technology relations may be changing human brain function and behaviour and potentially limiting or even diminishing human cognitive capacities and creativity (Carr 2010; Greenfield 2004; Jackson 2009; Lanier 2010; Small and Vorgan 2009; Rushkoff 2009, 2010).

In his recent book *You are not a gadget* (2010) Jaron Lanier fears that human creativity and endeavour is being "restricted in practice to what can be represented by a computer" (10). He argues in McLuhanesque fashion that technologists play a key role in changing human nature and behaviour by shaping the functions and interfaces of technologies: "We make up extensions to your being, like remote eyes and ears (webcams and mobile phones) and expanded memory (the world of details you can search for online). These become the structures by which you connect to the world and to other people. These structures in turn can change how you conceive of yourself and the world. We tinker with your philosophy by direct manipulation of your cognitive experience…"" (2010: 5-6).

As humans and machines increasingly work together in extended cyborgian systems, it is important to understand the ways that computers see and process information so that we have a better understanding of their strengths and limitations. Sci-fi views of cyborgian terminator-style vision promote an unrealistic expectation of the capabilities of augmented computer vision systems. We must be cautious about seeing too close a cybernetic equivalence (Wiener 1961) between computational and human processes.

Human vision and cognitive processes operate in very different ways to those of computer systems. It is difficult for a computer to know what to focus on and recognise—computer vision is indiscriminate in this regard, everything in a scene

is potentially equally significant. Giving priority to one information source over another and assigning value can be achieved via algorithms but only if all variables are known and pre-programmed. Humans on the other hand, tend to extract information from the world on a 'just-in-time' basis. What we focus on is based on what is of interest and importance to us. We don't have to build up a complete model of our physical environment first (Clark 2008). Human vision and the interpretation of visual information is a highly contextual activity. What we see and what we understand depends on environmental, cultural and social contexts. When we look at objects we instantaneously assess what they are (recognition), and their contextual significance, i.e. what we can do with them (their affordances) or what they can do to us (their potential threat level). Emotional factors (the affective valence and meaning of information) are of huge importance in human decision-making. We see through a process of constructive and enactive vision (Noë 2004).

Computers only know the information they are programmed with, can access from the Internet or other networked sources, or can sense directly from their environment. Despite the huge advances that have been made in computer vision, object recognition is still a difficult and complex process. First of all, a computer vision system needs to be able to separate an object from its background; this is often difficult because of poor lighting or if the visual field is cluttered and the object is partially blocked by other objects. It then needs to be able to recognise the object which requires that the object already exists in the computer's database. Since objects typically have multiple appearances depending on the angle and distance from which they are seen, computer object recognition systems need to be trained with multiple examples of the target object to make the system more reliable (Belongie 2005; Levy 2006).

Looking at a robot's-eye view of the world and investigating some of the limitations of current computer vision and augmented reality applications we can gain some interesting and instructive insights that give us a more realistic picture of the operation and limitations of machine vision and decision-making processes.

In David Rokeby's seminal artwork *The Giver of Names* (1991-), we witness the slow and painstaking operation of a machine vision system as it analyses, interprets and names a series of objects placed on a pedestal in front of it. The computer performs a variety of different types of image processing such as outline analysis, division into separate objects or parts, colour analysis and texture analysis, before it comes up with a description drawn from its programmed database. The artwork's database is based on a military computer vision system database to which Rokeby has added some additional more poetic and associational descriptions. This is definitely not 'terminator vision' but it represents a more realistic appraisal of computer vision systems. Watching camera-view footage of robots like Honda's ASIMO and Sony's AIBO, we see similar processes as the robot's analyse their visual surroundings. Recognition of specific objects and people (facial recognition) is increasingly possible but only if

the robot's database has been pre-programmed with multiple examples of the target objects they need to recognise.

Google Goggles (a visual search application) recognises books, artworks, logos and famous landmarks works by using the phone's camera to take a image and match that image against those in existing online databases. However, this recognition process only works if the items are in an existing database. The image recognition process can also be problematic if the object is not viewed from a frontal angle or cannot be clearly distinguished from its visual background. As Google points out in their promotional video, the system doesn't currently work well for items that have variable appearances such as food, cars, clothing, plants or animals (http://www.youtube.com/watch?v=Hhgfz0zPmH4).

The limitations of programmed databases are also a problem with contemporary augmented reality applications. The selling point of AR applications like Layar and Wikitude is that they can deliver information in a context-sensitive and timely fashion. However, the type of information that is delivered can be extremely limited and partial. In 2009 the Sydney-based company MOB (Mobile Online Business Pty Ltd) created a Layar augmented reality application for Sculpture by the Sea, a sculpture walk that covers 2.4 kilometres of Sydney coastline from Bondi to Tamarama. The Sculpture by the Sea layar was promoted to the public on the event's website as follows: "For a truly unique experience, Mobile Augmented Reality … technology allows you to view information overlaid on your screen as you hold up your mobile phone and pan it around the exhibition. Visitors will be able to see which sculptures are nearby, as well as photos and information about the invited artists" (http://sculpturebythesea.com/media/mobile.html).

While the PR blurb sounded promising, the actual experience was frustrating and disappointing. As I held my iPhone camera towards sculptures on the walk, most of them seemed to be completely invisible to the Layar application. I could see the sculptures clearly but the Layar AR application couldn't. With the small number of sculptures that were recognised, the Layar application generated an image and some additional information about the work and artist but what dominated my iPhone screen was a proliferation of other extraneous information about nearby cafes and bus stops.

Reading about the project later on Layar's blog (http://site.layar.com/company/blog/32-new-layers-launched-get-inspired-by-art-culture-layers/), the reasons for my disappointment became clearer. Alex Young, one of the developers from MOB, describes the Sculpture by the Sea Layar as follows "The layer showed people where the Public Facilities such as toilets, bus stops and cafe's were as well as providing detailed information on sculptures from a set of the exhibiting artists." Why just a set of the exhibiting artists? Because the printed catalogue was a revenue source for the Sculpture by the Sea organization. While Young comments that with the launch of the Layar App store, the Sculpture by the Sea Layar app could be sold as an alternative to the print catalogue and give more complete information, nevertheless this example

highlights one of the key problems of AR applications. The type and amount of information provided is limited by what somebody else (not you the user) decides to make available or by what is independently available in existing online databases.

Rather than the lofty goals of early proponents of human-machine symbiosis (Licklider 1960) and human intelligence augmentation (Engelbart 1962), current AR applications available to the general public are centred around prosaic tasks of finding the nearest train station, public toilet or coffee shop. Despite the fact that we can turn layars on and off, many commercially produced AR applications are driven by a marketing agenda and result in cognitive overload and visual clutter. Similar experiences occur with Google Maps, where advertising and promotional content dominate the field of visual information. The local patisserie where I buy croissants is functionally invisible on Google map view. I can see it in Google Street View, but when I switch to Map View its name does not appear amongst the names of other local cafes and businesses. The augmented information is not necessarily what you want to see but what someone else wants you to see. Perhaps the marketers' ultimate aim would be to program us just like robots so that we see what they want us to see and process that information just like the good little consumers they would like us to be.

Of course, there are many laudable non-commercial AR applications. Museums such as Sydney's Powerhouse Museum offer augmented reality content that gives additional information about museum exhibits or local landmarks. Artists are also creating a variety of AR applications that augment everyday reality with creative content, poetic interpretations and imaginative narratives. Julian Oliver's Artvertiser AR project replaces the visual clutter of urban billboard advertising with material created by artists (http://selectparks.net/~julian/theartvertiser). However, even with the best intentions of the content providers, this type of experience is more accurately described as 'Diminished Reality' or 'Directed Reality' rather than Augmented Reality. AR applications extract, emphasise and interpret a limited slice of the reality that is available to us in our unaugmented visual field. They frame and direct our understanding by giving pre-fabricated and partial interpretation and analysis, thereby limiting and constraining our perception and understanding.

At the moment the unreliability of mobile AR platforms and their high energy demands means that they are unlikely to be used as an everyday occurrence. However, as they become more reliable and convenient to use, there is a danger that rather than consulting a broader range of online and offline sources, users may come to rely on a more limited set of information that they will offer. More worryingly, these informational and imaginative associations may come to replace our own cognitive and imaginative processes—how much of our thinking, imagination and creativity do we really want to outsource to our augmenting technologies?

AR devices also have a tendency to distract from the physical environment they are augmenting. This 'Distracted Reality' aspect to AR results both from the

visual clutter of the AR display as well as the way in which they literally distract our gaze from the physical environment to the hermeneutic display device. What happens when robot vision conflicts with human vision? Which do we trust? I often follow the progress of my car journey on Google Maps but quite frequently the map shows my car blithely careening off the road into surrounding buildings despite the fact I am actually safely on the road. Of course, it's clear in this situation that human vision and intelligence beats GPS tracking and computer visualisation. But this is not always the case. There have been reports of drivers getting lost and having accidents after following the sometimes erroneous directions of Google Maps or SatNav applications, trusting these augmented reality applications more than the evidence of their own eyes. A woman in Park City, Utah, walked onto a busy highway, where she was struck by a vehicle after Googling walking directions on her Blackberry. While presumably she could see that she was walking onto a busy highway with no footpath, she followed the Google Maps directions anyway. She's now suing Google for damages (Matyszczyk 2010).

While augmented vision and augmented reality applications offer some exciting new possibilities, we must be careful that we understand their limitations and remain aware of the ways they may diminish as well as augment our perception of the world. With computer systems that usefully extend and augment human capacities and cognition, we are moving in the right direction, but we must guard against computerised cyborgian systems that replace or diminish human faculties, creativity and our experience of the world. In augmenting human vision and cognitive processes, we need to make sure that we continue to value and use the full range of our human sensory and cognitive faculties and don't limit ourselves to the hermeneutic blinkers of a robot's-eye view and understanding of the world. A productive symbiotic human-technology cyborgian future is one where human capacities, individuality and creativity are enhanced rather than diminished and constrained by technological or consumerist agendas.

Bibliography

Belongie, Serge. *Computer Vision, Fact & Fiction: an Exploration of Computer Vision in Film and its Reality* [DVD]. Department of Computer Science & Engineering, University of California, San Diego. (Funded by California Institute for Telecommunications and Information Technology). 2005.

Carr, Nicholas G. *The Shallows: What the Internet Is Doing to Our Brains*. 1st ed. New York: W.W. Norton, 2010.

Clark, Andy. *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence*. New York: Oxford University Press, 2003.

———. *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*. Oxford; New York: Oxford University Press, 2008.

Doidge, Norman. *The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science*. Carlton North, Vic.: Scribe Publications, 2008.

Engelbart, Doug. "Augmenting Human Intellect: A Conceptual Framework." Washington 25, DC: Air Force Office of Scientific Research, 1962.

Fitzpatrick, Michael. "Mobile Phones Get Cyborg Vision," *BBC News*, 11 August, 2009, accessed 20 July, 2010, http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/8193951.stm

Gray, Richard. "Contact Lenses with Terminator Vision." *Telegraph*, 27 January, 2008, accessed 20 July, http://www.telegraph.co.uk/science/science-news/3323248/Contact-lenses-with-Terminator-vision.html.

Greenfield, Susan. *Tomorrow's People: How 21st-Century Technology Is Changing the Way We Think and Feel*. London: Penguin, 2004.

Ihde, Don. *Technology and the Lifeworld: From Garden to Earth*. Bloomington: Indiana University Press, 1990.

———. *Bodies in Technology*, Electronic Mediations ; V. 5. Minneapolis: University of Minnesota Press, 2002.

Jackson, Maggie. *Distracted: The Erosion of Attention and the Coming Dark Age*. Amherst, New York: Prometheus Books, 2009.

Levy, David N. L. *Robots Unlimited: Life in a Virtual Age*. Wellesley, MA: A K Peters, 2006.

Licklider, J. C. R. "Man-Computer Symbiosis." *IRE Transactions on Human Factors in Electronics* HFE-1 (1960): 4-11.

Matyszczyk, Chris. "Woman, Hit by Car, Sues Google for Faulty Directions." *news.cnet.com*, May 31, 2010, accessed 20 July,

http://news.cnet.com/8301-17852_3-20006379-71.html.

McLuhan, Marshall. *Understanding Media: The Extensions of Man*. 1st Sphere ed. London: Sphere Books, 1967.

Noë, Alva. *Action in Perception*, Cambridge, Mass.: MIT Press, 2004.

Plato. *Phaedrus*. Translated by Robin Waterfield. Oxford; New York: Oxford University Press, 2002.

Pranav, Mistry. "Pranav Mistry: The Thrilling Potential of Sixthsense Technology." Ted Talks, http://www.ted.com/talks/pranav_mistry_the_thrilling_potential_of_sixthsense_technology.html.

Rushkoff, Douglas. *Life Inc.: How the World Became a Corporation and How to Take It Back*. New York: Random House Inc., 2009.

Rushkoff, Douglas. *Program or Be Programmed: Ten Commands for a Digital Age*: OR Books, 2010.

Small, Gary, and Gigi Vorgan. *iBrain: Surviving the Technological Alteration of the Modern Mind*. New York: Harper, 2009.

Stiegler, Bernard. *Technics and Time*. 2 vols. Stanford, Calif.: Stanford University Press, 1998.

Verbeek, Peter-Paul. "Cyborg Intentionality: Rethinking the Phenomenology of Human–Technology Relations." *Phenomenology and the Cognitive Sciences* 7, no. 3 (2008): 387-95.

Wiener, Norbert. *Cybernetics: Or Control and Communication in the Animal and the Machine*. 2nd ed. Cambridge, Mass.: M.I.T. Pre

Take a Good Hard Look at Yourself: *Autoscopia* and the Networked Image.

Justin Clemens University of Melbourne
Adam Nash RMIT

Abstract

In *Art Power*, the curator-critic Boris Groys writes: "the digital image, to be seen, should not be merely exhibited but staged, performed. One can say that digitalisation turns the visual arts into a performing art". In other words, contra Walter Benjamin[1]s prognosis that, in the age of mechanical reproducibility, the distinction between original and copy would be thoroughly reduced or transformed, we now witness the emergence of a new division even more radical than that of original and copy. This division, a consequence of our new post-convergent media, is that between data and its modulation. All digital data, detached from its original semantic source, is formless and placeless until modulated into a display register. Devoid of qualities, it can thereafter be modulated into any display register, contingent entirely on parameters decided by some kind of agent, whatever that agent may be. Under this description, early 2000s concepts of mediacy and hypermediacy become simply potential vectors of the usability of images, rather than defining characteristics of the digital universe. This presentation discusses *Autoscopia*, a collaborative online artwork commissioned by the National Portrait Gallery Canberra for an exhibition entitled *Doppelganger* in 2009. The work uses multiple image and text searches to produce composite "portraits", that is, artificial identities that are thereafter recursively reincorporated into the search-results themselves. These portraits are therefore network performances, with undifferentiated data as their elements and resulting in a new kind of performative image.

Introduction

Today, human life is dominated by the pervasiveness of post-convergent media exemplified by Web 2.0, social networks and the concept of *search*.[1] A radically new development, a truly global system, entirely technical, linked in real-time, the

[1]If the research on this point is by now enormous, see, above all, the now classic work by Manuel Castells, *The Rise of the Network Society* (Oxford: Blackwell, 1996), e.g., 'Toward the end of the second millennium of the Christian Era several events of historical significance have transformed the social landscape of human life. A technological revolution, centered around information technologies, is reshaping, at accelerated pace, the material basis of society. Economies throughout the world have become globally interdependent, introducing a new form of relationship between economy, state, and society, in a system of variable geometry...Capitalism itself has undergone a process of profound restructuring, characterized by greater flexibility in management; decentralization and networking of firms both internally and in their relationship to other firms; considerable empowering of capital vis-à-vis labor, with the concomitant decline of influence of the labor movement; increasing individualization and diversification of working relationships; massive incorporation of women into the paid labor force, usually under discriminatory conditions; intervention of the state to deregulate markets selectively, and to undo the welfare state, with different intensity and orientations depending upon the nature of political forces and institutions in each society; stepped-up global economic competition, in a context of increasing geographic and cultural differentiation of settings for capital accumulation and management,' pp. 1-2. One might refer also to other proposals such as Ulrich Beck's 'Just as modernization dissolved the structure of feudal society in the nineteenth century and produced the industrial society, modernization today is dissolving industrial society and another modernity is coming into being,' *Risk Society: Towards a New Modernity*, trans. M. Ritter (London: Sage, 1992), p. 10. Or: M. Hardt and A. Negri, *Empire* (Cambridge: Harvard University Press, 2001), as well as their sequels Multitude and Commonwealth, and the popularizing work on 'liquid modernity,' 'liquid love,' 'liquid life,' etc., by Zygmunt Bauman.

pervasive Web of data is our Unconscious today. What does this mean for imaging? What position does the concept of *image* occupy in the post-convergent mediascape, and can the concept even be thought of as separate from other forms of perception, production and work in the medium of the digital network? Clearly, digital images share with all other digital media — whether it be sound, text, Facebook profiles, whatever is available on a hard drive or the internet — the crucial quality of having been digitized, that is, of having been modulated into digital data, and stored as such, in order to then be re-modulated into a display register of some kind.[2]

What we mean by 'modulation' here is drawn from Gilles Deleuze's influential short essay on control societies. Deleuze writes:

> "the different control mechanisms are inseparable variations, forming a system of variable geometry the language of which is numerical (which doesn't necessarily mean binary). Enclosures are *molds*, distinct castings, but controls are a *modulation*, like a self-deforming cast that will continuously change from one moment to the other, or like a sieve whose mesh will transmute from point to point."[3]

This is a suggestive, if basically metaphorical use of the term. What 'modulation' means in music is simply to change key, whereas in telecommunications and electronics, it means to cause the qualities of one signal to vary in accordance with another signal in order to enable its transmission. We would like these senses to resonate in the background of our use of the word, but ultimately we are simply using it to denominate the transition from data to information or vice-versa. Many other words could be used in place of 'modulation,' e.g., 'transform,' 'transduce,' 'interpret,' etc. The point is conceptual, not nominal; essentially any cognate term would do.[4]

Epistemologically, information is a collection or set of data. We need to insist on this fundamental difference between 'data' and 'information,' i.e., that information arises from an *interpretation* of data. If this difference is missed, misconceptions about the real status of new media start to creep back in, as if inevitably. It is absolutely crucial to underline that contemporary media are founded upon *data*, which has a unique ontological status. Once modulated into digital data, this data can be re-modulated ('interpreted') into any display register, that is, into information. *Information* is not stored nor transmitted by digital networks: only data is. Information is the output into a display register of data. An image can be re-modulated and displayed as sound, sound as text, a Facebook update as an image. Digital data is formless and plastic. One cannot even properly speak of data as strings of 'zeros and ones,' although this is an example often used by

[2] See the work of Friedrich Kittler on the ontology of new media, e.g., 'Towards an Ontology of Media,' *Theory, Culture & Society*, Vol. 26, No. 2-3 (2009), pp. 23-31.
[3] See G. Deleuze, 'Postscript on the Societies of Control,' *October*, No. 59 (1992).
[4] Of course, one of the problems endemic to theorizing new media is the uncircumventable problem of vocabulary: does one coin a new term or attempt to repurpose an existing one? Both routes can generate further misunderstandings!

theorists to convey the radically inhuman nature of data. Why not? Because merely speaking of zeros and ones is already interpreting the machinic operations in minimally anthropomorphic terms. No computer has any concept of 0 or 1 — which remains human, all too human information. What becomes clear, then, is that the choice of parameters which govern re-modulation is crucial to the transmission and display of any data. An 'image,' in other words, today directly presents itself as a contingent-interpretation-of-an-underdetermined-data-set.

Contemporary Concepts of Digital Media

Within the framework of this paper, an overview of some influential thinking on this subject must be brief. We cite seven major authorities in the field — Boris Groys, Jay David Bolter and Richard Grusin, Ian Bogost, Mary Flanagan, Alexander Galloway, Bernard Stiegler and Edward Fredkin — in order to draw out certain key aspects of digital media that each of these identify, yet none articulate together. The key aspects will be: performativity; mediacy; unification; instruction; gaming; hypomnesia; and digital ontology. In drawing out these aspects, we simultaneously suggest how they can themselves be more adequately understood in terms of (ontological) *leveling*, *parameterisation* and *remodulation*.

In *Art Power* (2008), Groys writes: "One can say that digitalization (*sic*) turns the visual arts into a performing art"[5], and talks briefly of the myriad software and hardware negotiations that must occur for the image to appear in a display register. If this is indeed true of digital images, then it remains true for all digital presentations, of anything that is digitized. Groys insists on ascribing a strange mixture of religion and overly-fetishised spatial topology to the process of modulation. He calls *Invisible*, with a capital *I*, the state that data enters upon its modulation into a storage medium and asserts that the subsequent remodulation back into display is somehow analogous to the sacrilegious act of visualising the face of God, an analogy that seems to ascribe some kind of extra-human or spiritual power of being to data. In fact, data should be considered in terms precisely opposed to these; exclusively and necessarily material product. Groys thereby properly identifies, but subsequently misreads, the nature of digital data as formless and plastic, able to be re-modulated in any way whatsoever.[6] Without explicitly identifying the act of re-modulation (ie, the act of establishing parameters by which to display) as crucial to the performative act, he correctly identifies the difference between a digital image and an analog image as the difference between visuality and performativity, and that every performance is an interpretation. However, this interpretation is first performed in the selection of parameters by which the digital data is rendered in the display register, and this is the condition of possibility of the qualities Groys identifies in digital images, that of proliferation and its attendant distortions. In other words, while Groys is absolutely correct about the new kind of performativity of digital images, he misses what we might call its double-face: each 'performance' of an image is

[5] B. Groys, *Art Power* (Cambridge: MIT, 2008), p. 84
[6] Groys, *Art Power*, pp. 84-85

already a double act, in which what is visualized is patently the consequence of a decision — however automated — to modulate the data into a visual register. Something is given *to* vision as the consequence of a decision *for* vision. As Groys puts it, 'In the world of digitalized images, we are dealing only with originals — only with original presentations of the absent, invisible digital original' (91). *Contra* Groys, this is not however a new kind of idolatry or iconophilia, but the patency of the contingency of material operations, which forces us to reconsider the generation of intensities for their users.

In this vein, Bolter and Grusin, in their very influential book *Remediation*, discuss the process of digital imagery in terms of a dialectic with visual culture. Their concepts of *immediacy* and *hypermediacy* are useful in interpreting and contextualizing the nature of digital media in terms of relationships with prior art and entertainment forms. For Bolter and Grusin, who perhaps implicitly accept a kind of priority of visual culture in their approach and their examples, new media have a double import. On the one hand, they aim (and have the capacity) to present the real in all its immediacy, or at least more-immediately-than-all-prior-media. This is part of digital media's undoubted power, its very production of the real through unprecedented simulation-effects, whereby its patently 'unprecedented' nature is an integral part of its powers. 'New' media are not simply new in the sense of not-being-available-before, but in the sense that they integrally *present themselves as such*. On the other hand, in doing so, they draw attention to themselves *as* media. Strangely enough, then, and even though they identify the World Wide Web's insistence on the reality of mediation, their theories — unlike Groys' — do not explicitly identify the performative act of modulation and re-modulation that is required to render any digital media in any display register.[7] In other words, Groys gets the performativity, but not the relationality of media; Bolter and Grusin get the relationality, but not the performativity of such images.

Perhaps the contemporary cultural products most invested in the performative act of modulation of digital data to and from display registers are videogames. Ian Bogost, in his 2006 book *Unit Operations: An Approach to Videogame Criticism*, argues against the concept that humans are the product of their technology, a concept that he ascribes to Friedrich Kittler and Neil Postman. Instead, Bogost claims that software and programming are a "possible mode of expression equivalent to any other, striving to meet, describe, and comment on human activities, needs, and relations."[8] He comes much closer to the concept of modulation of digital data when discussing object-oriented programming languages as paradigmatic of his concept of "unit operations" — discrete, programmatic units of meaning — but misses the crucial, universal, levelling operation of modulation into digital data: "Binary storage then becomes an accident of convenience, one undeniably relevant, but given the same status as was accorded manufactured ink to the book in the nineteenth century or

[7] D.J. Bolter and R. Grusin, *Remediation: Understanding New Media* (Cambridge: MIT, 2000), p. 210.
[8] I. Bogost, *Unit Operations* (Cambridge: MIT, 2006) p. 37

monochromatics to the early cinema." [9] Although it is difficult to adequately interpret this problematic analogy, it is clear that there has been nothing like digital data in the history of human cultural production, and it certainly has a fundamentally different ontology to "ink" or "monochromatics". Groys perhaps comes a little closer with his analogy of digital data as similar to a musical score ("For music to resound, it has to be performed.")[10], but again the analogy is lacking. Digital data is the universal leveler of all media because, once modulated into digital data, it can then be re-modulated into *any* register. It is the choice of parameters with which to perform this re-modulation, that constitutes the fundamental performative act of digital media. Bogost acknowledges that programming languages, and he is specifically interested in *object-oriented* programming languages, are encapsulations of representations. This does not deal with the modulations between digital data and modulation because, in this respect, programming languages (especially object oriented programming languages) are, like any other operation performed on digital media, operations within frameworks of parameters that must be established before the modulation can be carried out. We can therefore add the problematic of data as the *Great Leveler* to our points to date.

Mary Flanagan, in her 2009 book *Critical Play*, outlines the connection between the formalized rule sets of games, and the early 1960s *instructional art* of Yoko Ono, where "Ono gave participants instructions on how to create the artwork themselves."[11] While in some ways reminiscent of Groys' musical score analogy, it nonetheless comes closer to an identification of the act of modulation. Ono's work exists at the moment of modulation, playing with the participants' intuitive knowledge of the requirement of a formalized framework of parameters for modulation by simultaneously requiring and confounding such parameters. We can therefore extend Flanagan's insight further. With digital media, what is self-effacing are precisely the indispensable instructions that found our interactivity with the media. Instructions become tacit and gestural, linked to our task-oriented-retraining through the play of the body — and not because we are told to do this or that. We already touched on this point above when we said that Groys misses the irreducibly double aspect of digital performativity; we can now add that, following Flanagan, the instructions are immanent to digital media, not declarative, and that this immanentization-of-instruction, its tacit educative function, exposes not just the necessity of remodulation but the essential remodulability of the digital. Each digital image is the outcome of an interactive performance that, as such presents itself as part of a set of possibilities it did not and could not actualize.

Alexander Galloway, in his 2006 book *Gaming: Essays on Algorithmic Culture*, identifies the crucial difference of videogames, as opposed to other cultural products like images and films, as being that "*video games are actions*" (emphasis in original). He maintains that this ludic or "gamic" action is distinct

[9] Bogost, *Unit Operations*, p. 37
[10] Groys, *Art Power*, p. 84
[11] M. Flanagan, *Critical Play: Radical Game Design* (MIT Press, Cambridge, 2009), p. 140.

from notions of interactivity because videogames instigate "material change through action."[12] This persuasive view of the medium doesn't however concern itself with the act of modulation to and from digital data, even though Galloway specifically rejects any difference between the actions of the human player and the actions of the machine. Like Bogost, Galloway evokes the name of Kittler, but he does so to illustrate the fundamentally *physical* process of electronic circuitry that programming languages call into action. However, he misses the crucial point that, at each junction along the way, a set of predetermined parameters are being abided by in order to modulate between states. These parameter frameworks are always designed by humans (albeit in a manner sometimes heavily influenced by the behaviour of physical phenomena) in order to create a series of de- and re-modulations that attempt to ensure a predictable process of transmission to and from display registers that are perceptible to humans.[13]

Bernard Steigler thinks of digital networks and storage in Platonic terms as *hypomnesis*, or the exteriorisation of memory, and, following Derrida, shows that this external memory cannot be opposed to internal memory, or *amanesis*. It is rather that internal memory is in fact configured in the process of exteriorisation. Steigler considers digitisation as continuing the historical/physical process of grammatisation that results in, as he calls it, 'the cognitive capitalism of today's hyperindustrial service economies.'[14] While he correctly identifies that 'sender and receiver no longer coincide with encoder and decoder,'[15] Stiegler attributes an overly deterministic agency to digital technologies by conflating the task of machinic encoding/decoding with the human task of interpretation, and in this he misses the subtle point that pre-digital technologies also necessarily involved this split, even when the sites of encoding/decoding and interpretation coincided. In other words, he misses the point that reading and writing skills have not, in fact, been delegated to machines – rather, machines have been programmed by humans with a set of parameters with which to modulate between storage and display registers, in order that humans can do the reading and writing, ie, the interpreting. This leads him to misread the nature of real-time communications as devoid of modulation or paramterisation, when in fact it is the crucial technical and conceptual means by which humans are able to realise such communications. That they *appear* to occur with no delay is immaterial to the technical fact that all such communications – anything that 'happens' on the digital network – undergoes a constant process of modulation and demodulation according to a strictly pre-determined set of parameters.[16] At the same time, Stiegler acknowledges the participative qualities of Web2.0-style technologies as

[12] A. Galloway, *Gaming: Essays on Algorithmic Culture* (Minneapolis: University of Minnesota Press, 2006), p. 4

[13] See also T. Apperley, *Gaming Rhythms: Play and Counterplay from the Situated to the Global* (Amsterdam: Institute of Network Cultures, 2010), in which he notes 'even when discussing one game, each instance of play is different' (p.7) and he proposes Lefebvre's 'concept of rhythm…for examining the negotiations between rhythms in the local instantiation of digital game play' (7-8).

[14] Stiegler, *Memory*, in Mitchell & Hansen (eds), *Critical Terms for Media Studies* (Chicago: University of Chicago Press, 2010), p. 71

[15] Stiegler, *Memory*, p. 83

[16] Stiegler, *Memory*, p. 79

facilitating the removal of the producer/consumer opposition on which the era of mass media relied, thus ushering in an era of 'associated technical milieu.'[17] We see this as the positive, intrinsic, potential of the leveling nature of digital data, and we are very optimistic about the opportunities this offers to artists.

Finally, Edward Fredkin, along with other fellow-thinkers such as Stephen Wolfram and Gregory Chaitin, has proposed a radical ontology of digital philosophy that takes the atomic model to the extreme by suggesting that the universe itself is fundamentally a process of digital computing.[18] Although we are not interested in arguing with this form of ontological approach — it seeming to us a rigorously logical method that projects *one* fundamental form of contemporary thought onto the universe in order to see what might result from such a projection — the powerful implications of Fredkin's position regarding new media specifically have been usefully drawn out by N. Katherine Hayles. As she puts it:

> "Fredkin suggested that 'the meaning of information is given by the processes that interpret it.' Although Fredkin did not develop the idea…the formulation goes significantly beyond first- and second-order cybernetics in giving a more enactive and embodied sense of information. Specifically, it breaks new ground by changing the meaning of 'interpretation' and of 'meaning.' Information in this view is inherently processual and contextual, with the context specified by the mechanisms of interpretation."[19]

This is precisely the point we wish to make by distinguishing information from data. Here, information becomes process — i.e., re-modulation — but materiality (what Hayles calls 'embodiment') has been effectively *digitized* by new media. Though we don't believe, with Fredkin, that the universe is digital, it certainly is from the point of view of new media themselves.

Performativity, mediacy, unification, instruction, gaming, hypomnesis, and digital ontology — is there a way of recomposing these elements in such a way as to construct a concept that functions as a kind of 'empirical transcendental' for them?

The Concept of Post-Convergence

As discussed, the process of modulation between digital data and display registers is fundamental to the contemporary era of digital, networked media. We identify this era as post-convergent. What does this mean? We define post-convergent as the period in the development of any given medium when, having converged all prior media within itself, it ceases to be used solely to recreate

[17] Stiegler, *Memory*, p. 83

[18] See Fredkin's website with accompanying papers < http://www.digitalphilosophy.org/Home/Papers/TOC/tabid/63/Default.aspx>, or G. Chaitin, 'Epistemology as Information Theory: From Leibniz to Ω,' Collapse No. 1 (2006), pp. 27-51.

[19] N. Katherine Hayles, *Cybernetics*, in Mitchell & Hansen (eds.) *Critical Terms for Media Studies* (Chicago: University of Chicago Press, 2010), p. 150

these prior media and starts to be used for creating work that is only possible in the new medium.

There are a number of paradoxes that emerge from a situation of post-convergence. In our “Seven Theses on the Concept of 'Post-Convergence,'” we put it like this:

- *Temporal*: it is only when a medium is recognised *as* a medium, and that it is therefore irreducible to its own contents, that it can be said to be becoming itself — and not just a dissimulating repetition of what’s already been available.
- *Logical*: this recognition opens up a set of new problems for the medium. What, if there are no existing models that express its potential, can be done with this medium? This recognition is therefore a moment at which a medium no longer recognises itself — other than as an unprecedented enigma, and as an injunction to experiment.
- *Polemical*: in its experiments, the new medium is going to have to contravene every established routine, law, operation and practice in order to identify some of its own intrinsic qualities.[20]

Note that, at the very moment a new medium is recognised *as* a medium, it becomes enigmatic: it changes the very limits and definition of what media are without giving any parameters for what the new medium can do. This triplet enjoins, even enforces, experimentation in the new media. Paradoxically so, as it happens, given the new relationship between constraint and indetermination that any new medium installs.

Imagery and identity performance in a Web 2.0 scenario, for example on *Facebook*, emerges from the excess created from the convergence of the web's constituent elements, and creates a new phenomenon that relies on both the understanding of these constituent elements, as well as an understanding of the new entity that is in excess of these elements. Most importantly, all prior media are available on the Web: satellite TV, texts, still and moving images, all linked globally in real-time. Add this to the accompanying elements of the ideology of 'consumer-power,' the extraordinary impact of the 'desk-top revolution,' the aftermath of the first wave of Web design (user-created content, which individualises the means of production and of distribution), and a new media science-fiction vision of participation, and you have something that is patently without any precedent in media history.

We want to concentrate here, however, on only a few aspects of Web 2.0. First, it is very clear that Web 2.0 is the 'great leveller' of information. One could not negotiate the Web without search-engines, and these search-engines

[20] Clemens and Nash, *Seven Theses on the Concept of Post-Convergence*, http://www.acva.net.au/blog/detail/seven_theses_on_the_concept_of_post-convergence accessed 20th October 2010

necessarily rely on input to search; this input must both be literal and must be taken literally. Literally literally, in fact, in a way that goes beyond even the most acutely anal philological study. Second, every search is itself registered as new data, and consequently creates new information. Third, this data is instantaneously and almost immutably inscribed in the system itself. Fourth, this data is integrally available as information to third-parties. There is not only no privacy *de facto* possible online, but no privacy *de jure* either. Fifth, this data must necessarily be modulated into display, and such display is now at once image/text/sound/movement, etc.

For anything whatsoever to be on the web, it must have been translated into data, and then this data must be remodulated out for display, according to parameters that are at once absolutely precise and relatively contingent. The Web is inherently decentred (no single strike would be able to wipe out communications), flexible (all data can be reproduced and rerouted), accessible (from any point), and realized virtuality (it's a non-decomposable homeodynamic assemblage of heterogeneous elements, including bodies, computers, programs, etc.).

The three key terms we want to emphasize are therefore: post-convergence, data, and modulation. It is in light of these terms that we turn to their impact upon identity, not least in that they constitute and expose a certain becoming-image of identity itself.

Modulation as* the *Performative Act in* Post-Convergent *Media

What does it mean for the digital image to be exemplarily performative? As discussed above, this claim has the following implications:

1) the image is a paradoxical one-multiple: it is one, because its inscription remains identical-without-identity; but it is also multiple, because every cashing-out of this identity in terms of remodulation into a display register renders it different each time (according to site-specific and technical exigencies, such as monitor colour, etc.);
2) the image is a paradoxical performative in that it does not only show itself, but it proves something about its dependence on its medium; in other words, the digital image *shows* that the received distinction between 'showing' and 'proving' is no longer pertinent;
3) the image is an interactive outcome of tacit instruction.

The constant movement of data in a symbiotic process of modulation, demodulation and remodulation is one of the defining characteristics of digital environments as a medium. Regardless of the final display characteristics of any given element (for example, image, colour, animation, audio, navigation, depth, time, etc.), that element is constituted through this constant process of the modulation of data.

To reiterate our initial definition above, *modulation* in this sense means the process of changing some phenomenon from one register into another an arbitrary number of times, usually for the purpose of storage and/or transmission. The term modulation has several uses in contemporary technical and artistic parlance, all of which represent a nuance of this basic underlying meaning of transforming a signal from one register to another. For example, in telecommunications, it specifically means the process of transmitting a message signal inside a carrier signal. In music, modulation means changing the *key* a piece of music is played in. In electronic music, it usually means using the qualities of one sound to *shape* another sound. In all cases, the end result is that the original signal arrives *intact* in a different register. It is *the same, but different* (think of the similarities and differences between a human voice heard in person and the same voice heard over a telephone, which is simultaneously recognisable as both a human voice and *not* a human voice), and this point is of key interest when examining the nature of data. All digital data constantly undergoes this process of modulation, demodulation and remodulation, in order that it may be perceived by humans.

From this, we can see that data is the medium, and modulation is the action that enables artworks to exist within that medium. But, what is the ontological status of data? What are the consequences of this constant modulation from one register to another, where everything is the same but different as/from itself, and what is the status of artworks produced within such a medium?

If data is the medium, what are its properties? We have briefly seen that modulation is the process by which the medium is transmitted, stored and, since the consumption of any work created within the medium relies on some kind of transmission, constituted. This can give us a clue as to the properties of the medium itself. Since, in the digital realm, data is simply data, decoupled from the semantic intention of its original signal, (any kind of data can be demodulated into any register), parameters must be established to ensure that the intention of the original signal is reconstituted upon its demodulation into its destination register. For example, it is quite possible to demodulate a digital image (such as may be taken by a digital camera of a material scene) into a sound editing program and play the data as sound, therefore parameters must be rigorously established that govern how any given digital data is de- and re-modulated. The notion of protocols or standardised processes that abound in the contemporary technical sphere (such as govern the internet, image compression, audio reproduction and so on) are expressions of this codification of parameters – both sides of a modulation exchange agree to adhere to a set of parameters in order that the intended result is achieved.

The practitioner creating digital work must remain very aware of the distinction between digital data-as-data and its demodulated display and therefore needs to maintain attentiveness if not control over the establishment of the parameters governing the modulation of this data. Since these parameters are governing

elements that may have originated within an environment constituted purely by digital data, it is entirely possible for the practitioner to create entities that can choose their own parameters. With such a recursively vast and dense matrix of potential interrelationships constantly re-informing and re-configuring each other, it is important that the practitioner have a good understanding of the nature or quality of the parameters being established, both technically and conceptually. It follows that the selection and manipulation of such parameters will also be subject to this constant modulation back and forth between data and its display, and also more broadly between considerations of parameters of 'purely' digital art and those of art in general.

Autoscopia

Since we have been insisting that, first, Web 2.0 is a patently post-convergent medium, and, second, that human beings are given their own identities by their communicational technologies, it is no surprise to read that, as Catherine Malabou puts it:

> "We are entirely ignorant of brain plasticity. Yet we are not at all ignorant of a certain kind of organization of labour — part-time jobs, temporary contracts, the demand for absolute mobility and adaptability, the demand for creativity…The brain is our work, and we do not know it. Yet we know very well that we live in a reticular society. We have understood that to survive today means to be connected to a network, to be capable of modulating one's efficacy. We know very well that every loss of suppleness means rejection, pure and simple."[21]

If the Web 2.0 is our extimacy, we would like to consider Lacan's Real, the Symbolic and the Imaginary in the light of post-convergent media. So it is no surprise that, as Paulo Virno says, 'In our epoch, the biological requirements of *Homo sapiens* (language faculty, non-specialization, neoteny, etc.) match up point-by-point with the most significant sociological categories (labour-power, flexibility, permanent education, etc.).'[22] This is unique to our era, then: the effective lock of telecommunicational capital onto our biological substrate through the web is no longer by means of an imposition upon, or restriction of, our fundamental biological potential, but through the exploitation of these generic capacities themselves. The Web is the key media agent of this exploitation, and pervasive data its means and emblem.

Because everything is modulated into digital data, and because all is fully searchable, and because identity is so important to everybody, and because we have a culturally-enforced tendency to identify ourselves by our name, nobody has as yet really worked through the implications of what this micro-capillary pervasiveness of data means. *Autoscopia* was one of our attempts to work through these implications. When telling a computer to scour the internet for a name, it is completely incapable of distinguishing between instances of anybody with that name, i.e., even the most primordial distinction between bullshit and

[21] C. Malabou, *What Should We Do with Our Brain?* Foreword M. Jeannerod. Trans. S. Rand (New York: Fordham, 2008), p. 10.
[22] Virno, pp. 144-5.

truth, it will go and mash it all together, and, knowing that, telling the program to composite all that data into one webpage with the formal qualities of a webpage, then the search engines we were exploiting to compose those results, would compose a new identity as if it were simply a person of that name. A very simple procedure. All it does is highlight the fact that all is modulation; once that happens, all semantic intention is removed; and you are presented at once with confounded imaginary, symbolic, and real elements of your identifications.

- Imaginary: your image, and your 'image of your image' (i.e., the libidinal affects associated with your own image) are presented to you as the collaged images of others. Your name is yours, but it is also the name of many others; the predicates associated with your name are meaningless strings of letters, and, to the extent that they make any sense at all, they confound you directly with others with whom you have absolutely nothing in common, and sometimes not even a name.
- Symbolic: the operations of the web are themselves shown in the flat denomination of search engines and the number of hits; the trace of your life is literally sustained by unreadable sequences of meaningless code; the recursive operations of the Web are shown as pulverizing your life into strings, registered only in your disappearance.
- Real: you are nowhere in the Web itself. Nothing individuated remains in the inscription of data, only the trace of immutable inhuman processes taking place according to the so-called 'laws of nature,' or, rather, the laws of computing.

In other words, with *Autoscopia* we wished to exploit and to affront the imaginary and symbolic elements of contemporary virtual life — that is, the narcissistic-aggressiveness incarnated in the wish to formalize images of oneself, and the characteristic operations of the media system itself — by exacerbating the most banal operations of Web 2.0 use, staging these operations, and then presenting the results as integrally recursive. This recursiveness can massively expand the web presence of a name — at the cost of stripping it and your image of clarity, distinctness, individuality, and by displaying this senselessness in the form of a web page (i.e., a data trail, a composite image, composite text, etc.) and a transient geometry of sound and colour.

What is identity when it is now given by something other than your image, your name, your personal history, what-have-you? The age of pervasive data forces us to take our own great levelling seriously. *Autoscopia* enables you to see yourself from a point of the global unconscious — at once contingent, infinite and incoherent.

Autoscopia is accessible at http://autoscopia.net and the work tweets all searches and constructed identities at http://twitter.com/autoscopia

Iconicity: the Medium of Miraculous Images

Edward Colless Victorian College of the Arts

1. Icon

Just how remote is the arcane theology of Byzantine icons from the twenty-first-century aesthetics of "new imaging" and "new media" addressed by this conference? Not as far as one might think; certainly, not as far as it was a decade ago. There's no denying that religious belief and other modes of spirituality have gained increasing topicality in artistic criticism since the turn of the millennium. We don't need to pathologize the currency of these terms by resort to so-called clash of civilizations or resurgent monotheistic fundamentalisms. The apocalyptic or at least antagonistic tone of renovated religious fervour is one rather narrow if strident aspect of the phenomenon. More intriguing from our cultural perspective is a broader trend in popular taste for supernaturalism and the occult that has been supplanting popular enthusiasms for the artifice of virtual or augmented reality. The fetishistic attention, for instance, given to dinosaurs throughout the 1990s – particularly in their virtual animation and potential revivification from fossilized DNA – has been succeeded by the cult allure of vampires and zombies as emblems of parasitical resurrection.

One might go further and say that the theoretical formulation of "subjectivity" central to arguments about neo-baroque spectatorship and spectacle, throughout the 1980s to late '90s, has been overtaken by an interest mediumistic channelling, telepathy and visionary esoterica, in short, by the "psychic". In a manner reminiscent of early cinema and its coincidence with the formulation of psychoanalysis, reality TV, media mobility and web-based social networking are now parodied in cinema and art as topographies of paranormal activity and as devices for capturing or unleashing errant and eerie psychic phemonena. From vampire melodrama such as *Twilight* and *True Blood* to the recent dazzling psychoanalytical allegory *Inception* (an allegory, too, not so much of media persuasion corporate power but of divine Incarnation), mundane reality is suspiciously and wondrously riven with demonic or divinely conspiratorial dimensions. In *Harry Potter* underworld and hermetic pre-modern lore (of wizardry or animistic, metamorphic supernature) re-enchant a modernist culture disenchanted by secular moral values founded on modern scientific knowledge.

Concurrently, historical studies also suggest a new wave of research interest in documentary accounts and polymath connoisseurship of wonders of nature (anomalous, ominous, miraculous) in antiquity and in the early modern period of the sixteenth to eighteenth centuries, with a polemical exposure of how "the passion of wonder" (in Barbara Maria Stafford's suggestive phrase) and the viral contaminant of supernature carried by this passion are implicated within rather

than erased by modern scientific objectivity and reportage.[1] In the domains of contemporary art and aesthetics, the anthropological and psychological *enigma* of desire (so serviceable and productive throughout the twentieth century) is being eclipsed – occulted, thrown into shadow – by a new ambience of arcane *mystery* and charisma, in which the phantasmic has an affinity with the phantasmagorical and the charmed.[2]

The relevance that Byzantine aesthetics might have to this milieu of debate over our new media and new imaging resides in a mysterious and charismatic intellectual artefact which is also a certain type of image that is not really an image at all. It is a mode of *eikon* that is especially suspicious, the sort of treacherous pseudo-icon known in Greek antiquity as a simulacrum. Yet it was the extraordinary invention of Byzantine iconolatry to defend the otherwise pagan complications of this iconic non-image for being, in its impossibility, an image true to its miraculous origin. One can only confer this discretionary respect for such a contrary image by insisting that it is an image not deserving of being visually illustrated. In this aspect, this type of icon is an aberration. The manifestation of this exemplary aberration of an image is what I call the condition of *iconicity*.

2. Iconolatry

Byzantine aesthetics identified a class of images as *acheiropoieta*—not made or composed by human hand (the term could be transliterated as "un-manu-factured"); although as will become clear one has to use the word "images" guardedly. *Acheiropoieta* were so-called miraculous relic icons, which began proliferating in the sixth century CE at a climactic phase of Byzantium's centuries-long war with the Persian empire, and at the start of a period of intense theological suspicion and scrutiny of persistent pagan legacies within Christian figural devotional art. *Archeiropoieta* were images created in the manner of an imprint, which in terms comprehensible to contemporary Byzantine art would be similar on one hand to the impress of a seal on clay or a cast image in imperial coinage (with the authenticity of power expressed in these) or, on the other hand, to the dye pattern in cloth (and the elusive aesthetic agency of this technique, which leaves an indelible mark on otherwise clean cloth).[3] Similar to coinage or dyed textiles, except that the cause of this imprint on *acheiropoieta* was the sheer immediate presence of the face or body of Christ: a corporeal vehicle of an incorporeal agent.

---

[1] Stafford, Barbara Maria and Frances Terpak, *Devices of Wonder: from the world in a box to images on a screen* (Los Angeles: Getty Research Institute, 2001), 6.See also Daston, Lorrain and Katherine Park, *Wonders and the Order of Nature, 1150-1750* (New York: Zone Books, 1998); and Daston, Lorrain and Peter Galison, *Objectivity* (New York: Zone Books, 2007).

[2] The so-called resurgence of faith or religion in the twenty-first century is a myth since it ignores the persistence of popular traditional belief (Judaism and Catholicism notably) within the public sphere of post-Enlightenment secular societies. But it could be regarded as a crucial myth, characteristic of our own time. For the implications of this hypothesis see Hlavajova, Maria *et al.*, *The Return of Religion and Other Myths: A Critical Reader in Contemporary Art* (Utrecht and Amsterdam: BAK & post editions, 2009).

[3] On the sources of the textual descriptions of *acheiropoieta* within the idiom of textiles dyeing and printing see Trilling, James, " The Image Not Made by Hands and the Byzantine Way of Seeing", in Kessler, Herbert L. And Gerhard Wolf, eds. *The Holy Face and the Paradox of Representation* (Bologna: Nuova Alfa Editoriale, 1998).

Theologically contested throughout the iconoclastic debates that raged from sixth to the eighth centuries in Byzantium and finally gaining assent with the second council of Nicaea in 787, *acheiropoieta* eluded the doctrinal prohibitions on graven images associated with pagan worship for two clear reasons. Firstly, images of pagan gods (who, according to church dogma, of course did not exist) were images with no true archetype, cause or agency and hence were phantasma; whereas an *acheiropoieton* had a direct, unmediated divine cause and was thus real. Secondly, although presentified in a material medium, the medium did not circumscribe its divine subject of Christ, thus Christ is not objectified in the medium, and so this subject is not reducible to the image nor contained by it or its media.[4] In our own cultural idiom we might say the iconic potency of the *acheiropoieton* is in its quality of hyperrealist *trompe l-oeil*, although not in the manner for instance of a cinematic special effect or illusionist sleight-of-hand in which the technology causing the image is concealed, but in the uncanny effect in which there appears to be no technology.

There are a number of historically famous examples and types of these supernatural images. By historical precedence, the originator of the genre was the Holy Face of Edessa. Like the lost portrait of Christ supposedly painted from life by St Luke (a legend arising in the fourteenth century), the Edessa Face was anecdotally associated with an artistic commission. The story goes like this. One of the converted Christian Abgar Kings of Edessa in northern Mesopotamia sends his painter and scribe Ananias to Judea to summon Christ to his capital. The man is ailing and wants to see Christ in person. Christ will not yield to such a summons, but offers Ananias a portrait to take back in his place. In the early accounts of this story (told by the fourth-century patriarch Eusebius, from a Syriac narrative by a disciple known as Addai), Christ sits for a painted portrait by Ananias. By the eighth century the portrait is no longer described as painted by an artist but as being miraculously formed when Christ presses his face into a cloth…actually, a commonplace sort of towel or napkin. Significantly, at this time a Latin modification of the word for this object – the Arabic word *Mandïl* – becomes the name for it, the *Mandylion*, naming the singular object as well as the generic image, and materializing the legend.[5] This relic stayed in Edessa until

---

[4] Platonism inspires the distinction in the Byzantine canon between images generated by nature (*kata phusin*) and images by artifice or art (*mimema*). Evidently, the efforts at clarifying the ontology of *acheiropoieta* are especially complicated by contemporaneous christology, notably the Pauline doctrine that Christ is the *eikon* of God the Father, made orthodox by Athanasius of Alexandria in the early fourth century: the image (Christ-*eikon*) is both the form (*morphe*) and idea (*eidos*) of God; whoever venerates the *eikon* venerates what is in it as form and idea. The *acheiropoieton* however disturbs this formula, since it is neither natural nor mimetic, requiring a third term invoking neither likeness (*homoiosis*) nor natural generation but supernatural hypostasis (*kat'hypostasin*). See Freedberg, David, *The Power of Images* (Chicago and London: University of Chicago Press, 1989), pp. 392 – 399. And for a detailed survey of the iconoclastic debates see Barasch, Moshe, *Icon: Studies in the History of an Idea* (New York and London: New York University Press, 1992).

[5] Cameron, Avril, "The Mandylion and Byzantine Iconoclasm", and Kessler, Herbert L., "Configuring the Invisible by Copying the Holy Face", both in Kessler, Herbert L. And Gerhard Wolf, eds. *The Holy Face and the Paradox of Representation* (Bologna: Nuova Alfa Editoriale, 1998).

the Byzantines finally took the city from the Muslim Caliphate, when the object was solemnly conveyed in 944 to Constantinople, where it was encased in gold and locked out of sight in the imperial sanctuary, the Pharos Chapel, as an object too sacred for mundane inspection. It stayed there until the Venetian Crusaders sacked Constantinople in 1204, when it was probably transported to Venice and then Rome.

There are many representations of the Edessa Face included within portrayals of historical saints anecdotally associated with it, and there are autonomous depictions of it (most famously the thirteenth-century Genoa *Mandylion* which has the generically bearded dark face of Christ, the physiognomy and complexion of which is derived from Egyptian funerary portraits in Memphis, hovering almost in the sperm-like tadpole form of Caspar the Friendly Ghost). But the next most famous *acheiropoieton* of the Holy Face would be the Veil of Veronica, which emerged as a cult in Rome in the late twelfth century. The *veronica,* as a collective term for this sort of image, is a hybrid pun on the saint's name as *vera icon* (*vera*: Latin, true; *eikon*: Greek, image). The name has also acquired a poignant glamour in Spanish bull fighting with the supreme finesse of a perilously near-fatal brush between bull's head and matador called the *paso veronica*. The bull fight jargon reminds us of a constitutive value to the sacred *veronica*: that it is a *paso* or move, a physical crossing and encounter, the sacredness of which (as index of an epiphanic moment) is inflected with an erotic gesture (which is as passionate as idolisation). Veronica's veil allegedly retained the shadowy face of Christ, left miraculously when she her nursed Christ momentarily on his way to crucifixion. The features are left on the veil as if deposited from sweat or blood or tears, but they not bio-matter excreted from the body's pores or wounds or glands. Instead this is a stain expressed as the volatile radiance of Christ's body; hence this stain is itself a subtle medium. It is an abstraction (sublimated as a graph or glyph of radiant glory and suffering) and also a real, crude mark, desublimated and, literally, a distillate. Likewise the notorious Turin Shroud, in all likelihood a fourteenth-century artefact, was allegedly the funeral shroud of Christ bearing the inapprehensible imprint of the body, as if those parts of the cloth in direct contact with his body were marked by that body's unearthly radiance and, through which stigma, the Incarnation of Christ is rendered as a facsimile of that dead body.[6]

Christ's blood, shed across the stations of the Passion, is transubstantiated in the *veronica* as a supramundane ink that signs off the Jewish covenant. The eroticism of the *veronica* is suasive of this contractual flourish of the body of Christ as a specific type of textuality, autographic, in a gesture that entails an authority not limited to visual similitude (*homoiosis*). In the Christian testament and its later Syriac apocrypha, Veronica (from the Macedonian *phere-nike* or Berenice) is identified as the *Hemorrhissa* – a woman whose menstruation miraculously stops when she touches Jesus's robe as he walks by her. Within

[6] For a recent summary of archeological and forensic assessments of the Turin Shroud see Cormack, Robin, *Painting the Soul: Icons, Death Masks and Shrouds* (London: Reaktion Books, 1997), pp. 89 – 132.

the Mosaic convention identifying menstruation as a pollution of the body, the woman is made pure by the touch of Christ; but since her menstruation ceases due to the contact with this male figure, it ceases as if due to her being made pregnant, as if inseminated through touch alone. The exegetical correspondence between this figure and the nursing Veronica of the Passion transposes the cessation of menstrual flow into the sweating blood of Christ: the *veronica* provides an anagogical image for Marian mythology with the miraculous conception of Jesus. The blood, sweat and tears of the *veronica* are transubstantiated as covenantal *logos* – as the autograph of Christ – in the imagery of sacrificial death, but they are also and ineradicably stains that suggest the menstrual polluting of the cloth, the *Mandil* or menstrual towel. The unmarked and unstained towel receives the miraculous imprint of Christ, analogous to the impregnation of Mary by the touch of God, a touch manifest in the Annunciation or announcement of pregnancy that is consubstantial with the miraculous insemination of the woman.[7] The sexual symbolism implicated in the *acheiropoieton* provides a meaning to the object; but the iconicity of the image is an expression of the relic's eroticism, sustained in its value as a "pass", a crossing of corporeal and incorporeal affect.

At this point we need to note two aspects of this type of miraculous image. Firstly, in its semiology it exhibits a singular precision of likeness, such that while it is technically a copy, as a perfect monoprint it is equivalent to its source, and so it too is the authentic source and origin for all other copies. It is authentic because what is visible in the print is what is perfectly intended: there is no deficit, nothing concealed or lost, nothing forgotten; the image has no "unconscious". There is *no mediation* of this image. In the well-known taxonomy of Pierce's semiotic, it satisfies the definition of both an icon and an index, but it does so contrarily, by being neither of these in any exclusive way. It is an icon inasmuch as it is a copy, and in the Byzantine doctrine that defines "iconolatry" in opposition to idolatry, an icon can only be venerated – not worshipped.[8] But, identically, as an indexical sign of divinity it is also a sacred relic, and thus more than an icon since it ought to be worshipped as an incarnate divine gesture in the same way as the divine body it depicts by this gesture can be worshipped.

The tenuous distinction here is a bit like that between an autograph and a signature. A signature is an existential flourish of one's being yet immanent to the

[7] See Kuryluk, Ewa, *Veronica and Her Cloth: History, Symbolism, and structure of a "True" Image"*, (Cambridge, Mass. And Oxford, UK: Basil Blackwell, 1991).

[8] This Pauline distinction is between *latreia* or worship and *proskynesis* or honoring. The latter permits recognition of religious images without their idolization, and is formulated in Bonaventure and then Aquinas as the image's edifying function; for the Jesuitical counter-reformers of the sixteenth and seventeenth centuries this distinction could be assimilated into the image's capacity to motivate passion as an encouragement of faith, providing the opportunity for a voluptuous religious encounter through the sensual image. In his iconoclastic euphoria, Tertullian (second century CE) uses the Pauline distinction vigorously antagonistic to any such voluptuary prospects: idolatrous *latreia* is associated with pagan religious spectacle, with enchantment and entertainment, with the seductions of the circus and, with particular spite, the luxurious cosmetic attractions of women.

event in which it is generated, momentary yet reproducible and also singular each time it is done; in order to be authentic a signature needs to be uniquely that of its author, and yet also resemble all other instances of itself in the past and future. An autograph designates a subtly different function of the sign: it is commemorative, a relic, and a fragment of its author. A signature attached to a document has an empowering agency as well as being the sign of textual and legal authorisation; it is practical and instrumental. An autograph, in comparison, is impractical and in a sense inoperative. On one hand it is a collectable aesthetic luxury; it conveys the aura of a signature without its agency, conveying that authoritative aura as mystique. On the other hand, the autograph's function is talismanic and apotropaic. It has a magical operation. It is word made flesh, the incarnate *logos* not as exemplar or rule but as annunciation, as unmanufactured creation, in an apparent magical act accompanied by the excalamation, "Look, no hands!"[9] Its milieu is not that of the law but of sacrament, of cult adoration. We could call *acheiropoieta* autographs. We might even call their unmanufactured appearance and occulted visibility a process of autography.

Secondly in its aesthetics, the *acheiropoieton* is a beguiling amalgam of medium and message, or one could say of subject and object. This correlates with the theology of Incarnation: matter and the immaterial coincide in the body of Christ. (But by divine will, not accident; and yet also ambiguously since, like the iconic function of the image and its indexical status, they not only correspond but are identical. The identity of Christ is announced in this identity of his index and his icon.) Yet most depictions of the *veronica* and the Edessa Face culminating in medieval iconographic canon show this face within the borders of the veil or towel while mysteriously hovering independently of the material surface – that's to say, without factoring in any signs of the incidental folds in the cloth let alone its piquant feminine circumstances.[10] The image is indifferent to its support, but in this particular way: as with the Christian incarnation, the face is supported by its material substrate (metaphoric of and contiguous with the female body) but not dependent on it or determined by it. With this ambiguity founded on a symptomatic disavowal, the *acheiropoieton* is comprehensible as the face of Christ but not apprehensible as a mediated image of that face. It is a true image in that its iconic function is indexical; but its indexicality is fully accounted for by its iconic function: it is true because there can be no difference between the image's subject and its object. Belief and disbelief (as disavowal) are identical in this passionate perception, this adoration. Acknowledging this aesthetic predicament, we see the indexical marks of the icon as *maculae* – unaccountable spots rather than impressions, and in that regard as we see the *idiomata* or

[9] On the impurity of hands and the *acheiropoieton* see Mondzain, Marie José, "The Holy Shroud: How Invisible Hands Weave the Undecideable", in Latour, Bruno and Peter Weibel (eds.), *Iconoclash: Beyond the Image Wars in Science, Religion, and Art* (Karlsruhe, Germany: ZKM and Cambridge, Mass: Massachusetts Institute of Technology, 2002).

[10] See Kessler, Herbert L. "Medieval Art as Argument", in Cassidy, B. ed. *Iconography at the Crossroads: Papers for the Colloquium Sponsored by the Index of Christian Art, Princeton University 23-24 March, 1990* (Princeton: Princeton University, 1993).

distinguishing features of this face as stigmata. I suggest calling this stigmatism produced by paradoxically unmediated images "iconicity".

The aesthetics of these strange images and their iconicity extends beyond their obscure milieu in Byzantine and medieval devotional practice. According to orthodox church doctrine, the transubstantiated Eucharist is also such a miraculous image: not metaphoric or symbolic but identical with the body of Christ. In similar terms, by which sign and medium are consubstantial, the stigmata (such as received by St Francis) are miraculous "images". Such consubstantiality might be also considered in relation to pornographic imagery, in which stimulus and response are not only correlated but identical. To a naïve perception, the media of photography and video might produce images that could also be classed *acheiropoieta*; but more pertinent variants of this imaging are the phenomena identified in *Gestalt* psychology that could be categorized as *pareidolia* (images at fault, or an image beside itself), such as the face of the man in the moon, the infamous "face on Mars", or UFO photographs. The issue of iconicity surprisingly also has bearing on imagery developed in the scientific visualisation of "invisible" objects, beyond the wavelengths of visible light: from X-ray imagery to electron-microscopy, MRI and CATscans, and radioastronomy. Perhaps the most intriguing case of an *acheiropoieton* in medical imaging (one that invokes both the semiotics and aesthetics of pornographic imagery – imagery "beside itself") is the Visible Human Project. In their different ways, these cases pose a problem recognised by the issue of transubstantation: what happens to the image when sign and substance are the same, when the medium is not only the message, but is also "miraculous"?

3. Iconoclasm

I have taken a liberty with this extension of Byzantine aesthetics to address the mediumistic mystique and immaterial affect in some of our contemporary imaging technologies. It sounds a provocation to align the Visible Human Project or even the quasi-pornographic "reality performer" of reality TV shows with the so-called miraculous face of Christ. But there is a principle or at least a cunning in this provocation, which could be called, appropriating a term from art historian Jurgis Baltrusaitis, a "depraved perspective". In his book on follies and phantasms in art and scientific history, *Aberrations*, Baltrusaitis uses this phrase to account for a recurrent procedure of investigation – a type of folly verging on madness – dominated by the passion to objectify the empirical sign in a conceit of perverse logic.[11] A perspective rendering taken to literalist excess (comparable to the literalising of figurative language) causes anomalies, displacements and corruptions of what is depicted. The Antipodes, for instance, can be described as the visionary outcome of such a depraved perspective: a speculative invention by ancient Greek cartographers which continued as a cartographical mirage well into the sixteenth century — the unknown south land was a "logical" necessity of mapping that then required discovery as a lost object. In Baltrusaitus's terms, we

[11] Baltrusaitus, Jurgis, *Aberrations: An Essay on the Legend of Forms*, trans. Richard Miller (Cambridge, Mass. And London, England: The MIT Press, 1989)

could say such depravity produces an "aberration" which is both false judgement and an implied perversion:

> "…a moral slip, an optical phenomenon in which a (celestial) body is apparently displaced from its true position and viewed as if it were elsewhere. Yet aberrations correspond to a reality of appearances and possess an undeniable faculty for transfiguration. The life of forms depends not only on the site in which they actually exist but also on that in which *they are seen* and recreate themselves."[12]

Is the Holy Face an antipodal aberration of divinity? Is the veil of Veronica God's *terra australis* – a speculative invention made to correct a perceived theological anomaly or even to fill an ontological hole? Could the *acheiropoieton* be a depravity ("a moral slip") as well as the optical displacement of a body of doctrine?

Folly verging on madness has a particular terrestrial displacement, with mythological but also theological resonances. It is the antipodal influence of the moon. What provides continuity among the numerous fables about lunar travel from Lucian to Cyrano de Bergerac to H.G. Wells is that the lunar disk is like a lens focussed on and revealing the chaos and folly of terrestrial reality. One example will do here: in Ariosto's epic poem *Orlando Furioso* (of 1532), St John and Duke Astolfo travel to the moon in search of Orlando's wits, which he had lost in madness due to excessive love. Ariosto's moon is where such mislaid or squandered things end up, the Bermuda Triangle of the passions: there you will find "A might mass of things strangely confused,/Things that on Earth were lost or were abused."

This moon makes an oddly overlooked appearance in, of all places, Nietzsche's iconoclastic aesthetics. "We somnambulists of the day", bewails Nietzsche, "…we artists!"[13] Artists: daydreamers, seemingly awake but in a trance, asleep in daylight. A kind of zombie. For Nietzsche, this notorious reprimand in his *Gay Science* is meant as a wake up call, a *reveille*, against the decadent luxury of aestheticism: of its perfume-drenched boudoirs and twilight bowers, of what he caustically identifies as "effeminacy" (the cloying idolatry, invoked by Goethe, of "the eternal feminine"). He rails against the folly of romantic idealism, of a pernicious, chaste aesthetic adoration of beauty that won't wake up to the emancipatory muscular vigour of corporeal existence. Just as the selflessly idealist love-struck cannot bear admitting to the dirty secrets of bodily functions without defiling the object of love, without turning the beloved into an indecent object of desire, so the idealism of art cultivates an ignorance – or at best a

[12] Baltrusaitus (1989), p. xi.

[13] "We artists.—When we love a woman we easily conceive a hatred for nature on account of all the repulsive natural functions to which every woman is subject. We prefer not to think of all this; but when our soul touches on these matters for once, it shrugs as it were and looks contemptuously at nature: we feel insulted; nature seems to encroach on our possessions, and with the profanest hands at that. Then we refuse to heed physiology and decree secretly: 'I want to hear nothing about the fact that a human being is something more than *soul and form*.' 'The human being under the skin' is for all lovers a horror and unthinkable, a blasphemy against God and love." Nietzsche, Friedrich, *The Gay Science*, trans. Walter Kauffman (New York: Vintage Books, 1974), pp. 125-126.

disregard – for the biology, psychology, industry and the economics of aesthetic allure, all of which would otherwise sully the art object, in the way an unattainable love might be desecrated and desublimated as sex.

"We artists," Nietzsche accuses, "we are moon-struck and God-struck!" Art is a pathological condition: on one hand *lunatic*, on the other *delusional*. The delusion is equivalent to being spellbound in love with (or in fear of) an Absolute that doesn't exist and exerts no real influence. Like the lover in endless adoration or imitation of the ideal feminine, the God-fearing artist worships a Beauty that is illusory. But God is dead. Art (like love) is actually free to be anything it can get away with: obscenity, criminality, commerce. No longer in deference to a God who subjects imagery to a harrowing truth test, who demands veneration and absolute fidelity of representation, art can enjoy the unfathomable falsity of the simulacrum. It can break idols. It ought to be a hammer. To be really modern, and free of the judgement of God, it will be iconoclastic. Any temperament that needs to refer imagery back to an ultimate source in an Ideal, any art that needs to prove its pedigree and honour an imaginary origin in divine creation, is delusional and weak.

Lunacy – being struck by the moon – is however, *pace* Nietszche, another matter! Not reducible to the desperate nostalgia offered by a stubborn after-image of a dead God but more like the importunate, sinister lingering of the Cheshire cat's smile. Is not the signature of lunacy so often an inappropriate stare or grin like that of the Cheshire cat, as if prompted by a frivolous or haughty private joke at the world's expense? This inner conviction of the lunatic may be a type of derangement, may even indicate a degradation (mental, physical, moral…); but lunacy is *not* a weakness. The lunatic, etymologically, is a sleepwalker, but of the night rather than the day: he or she walks errantly – but unerringly and sure-footed, if foolishly (on rooftops for instance) – within the obscure inspiration of the moon. Remember the Apollo astronaut who, while on a strictly supervised mission at the exquisitely desolate lunar landing site, bizarrely broke into a chirpy song ("I was strolling in the park one day…")? Was that light comedy relief, or was it a disturbing if momentary fugue state? Back in the control room at Houston they nervously laughed as they monitored the interruption to business; they didn't seem to know. Those whom the moon's ghostly light stirs to false wakefulness are out for a lunatic stroll in an uncanny nighttime, a false dawn. But sleep-walkers are not deluded. We say that they only think they are awake. Yet in a strange, unnerving way they indeed are. What do their eyes, wide shut, see: a Holy Face?

Compare this kind of spooky promenade, this kind of spectral yet navigable vision, with the sophisticated idling and loitering that is associated with the phenomenon of the *flâneur*. This character – the French verb *flâner* implies "to lounge about" as well as "to saunter" – was an emblem of metropolitan modernity and was the exemplar of the emerging modern artist. Championed by Walter Benjamin in his critical study of Baudelaire's poetry, the *flâneur* was a sophisticated idler and voyeur who strolled the boulevards and arcades and hung

about in cafes, immersed in their casual, fleeting dramatic intensities. Later, in the middle of twentieth century, the Situationists formulated a subversive agency to this figure (beyond its idleness) with the tactic of the *dérive*, an unmotivated locomotion or "drift" away from the spectacular code of the city's urban plan, misappropriating its communications and transport infrastructure for an irrational adventure of urban nomadism. (This tactical reclamation of microtopic or interstitial urban spaces is also allegedly exemplified more recently by the practice of skateboarders, graffiti artists and mall-rats as well as relational art.) Evidently, in contrast, the lunatic is no *flaneur*. (Nor is the lunatic a skateboarder or mall-rat.) Lunacy does not divert or detour or subvert social space. The lunatic is no more a rebel than is the epileptic. And there is no utopic redemption for lunacy: no relational art to redeem their asociality, no community of lunatics other than those incarcerated. Instead, strolling in a fugue state—in a paradoxically fearless flight or escape (an escape from nothing at all)—the somnambulist lunatic could be termed a *fugueur*: a "mad traveller", one who "takes off" in a fugue state, disappearing from home and work without reason or warning and without complaint, without any restless anxiety or tormenting paranoia, and who may figuratively "wake up" months or years later to find themselves living in another town, even in another identity.[14]

I propose that the *acheiropoieton* be treated as such a fugue state of Christ, as lunacy. Let us think of the transitional state of the *fugueur*, before they resettle, and think of it as an exemplum of the impossibly immediate, unmediated image of divinity: vagrant and amnesiac, *sans papiers* and stateless, lunatic. An art affiliated with the *acheiropoieton* will also be lunatic: such an art postulates the paradoxical aesthetics of an embodied ghost, of someone not so much displaced but who has literally "lost their senses". A deluded art is an art that is nostalgic for Godliness; and an art free of illusions would be a Godless art. But let us not confuse that with lunacy. We might say that the *fugueur*'s mad walk ends when he or she "comes to their senses": but their adventure has not been a delusion, a false consciousness from which they are liberated, or a spell that is broken. Rather, it is a psychic alterity, or an "alter-consciousness". The *fugueur* is awake, conscious of his or her actions, but not in their original identity. The deluded may be forgiven or at least may be granted some intercession, Christ suggests, for "they know not what they do". The lunatic is unforgivable, for they are not what they are. Unlike Nietszche's somnambulist, the mooning lunatic is unnaturally awake in the dark. Lunatic art is made by the moon's cold luminosity; a pallid reflection of sunlight, milky, leaching the colour of life out of faces but saturating the shadows with gleaming spectres, this light is like the Cheshire cat's leering grin persisting after its body has gone. There is nothing sentimental here: moonlight induces mad walks and mad love, although we should recognise that this madness is metamorphosis and charm. Moonlight delivers a licence for

[14] For an explication of the aetiology of the *fugueur* see Hacking, Ian, *Mad Travellers: Reflections on the Reality of Transient Mental Illness* (Cambridge, Mass: Harvard University Press, 2002).

mutation and with it insists on licentiousness: erotic, lycanthropic, ludic. Beneath it, women swoon or witches take flight, men turn into wolves, vampires hunt, and the world becomes a masquerade of mayhem, retrieving in ironic foolery the lost souls and passions otherwise disowned or cast away from disciplined sleep. Lunatic art soaks up this moonshine.

4. Iconicity

I admit my concoction of iconicity may be moonshine. Nonsense-talk: it may be counterfeit, jive, malarkey. Moonshine it is patently foolish. But it can be also an illicit bootleg brew, unregulated and hence dangerously potent. An intoxicating folly. Folly is the principle aesthetic form of lunatic art, and grand follies – architectural, intellectual, cosmological – are cathedrals of moonshine. Moonshine is the radiance of the deceptive face in the moon; it is the detached luminosity of a grinning ghost that gazes on the earth. And, we could say, it is the benediction of a nonsense version of God, the man in the moon whose beaming but cool smirk caricatures the face of the know-it-all God that arrives with a fanfare at daybreak. The face of the true God is immaculate, its ferocious purity and glory will blind those who look; but the moon's face is made up from *maculae*, from discoloured spots that disfigure, made up from stains, blots and smears. In other words: noise. It is no face at all: *ungestalten*, it is "green cheese", an unripened wheel of curds and whey like lumpy porridge. Moonshine is God as a joke. But it expresses the joke in stigmata, in the passionate adoration and deathly finesse of the *veronica*. And it is in that pass of the *veronica* that new images appear.

Zwischenräume: The Machine as Voyeur

Petra Gemeinboeck College of Fine Arts, UNSW
Rob Saunders University of Sydney

Abstract
This paper introduces the transdisciplinary strategies for the development of the robotic installation *Zwischenräume*, with a particular focus on its investigative visual intelligence. It develops the context for a machinic voyeurism to discuss the intricate relationship between the audience and a machine gazing back. Looking, reflecting and acting becomes a mutual process that propels the relationship between the machinic inhabitants and their human environment, as much as it does between the human inhabitants of the machinic environment. The strategies are developed and examined in the form of an installation environment, in which autonomous robots are embedded into the architectural fabric of a gallery space. Embedded into walls, the robots are intrinsically motivated to explore the environment and study the inhabitants. Each machinic assembly interacts and networks with the other machines by re-sculpting the environment, producing cracks, holes and scars, they develop strategies to survey, provoke, and conspire. The work adopts methods from urban combat and anti-terrorist visual intelligence to construct an autonomous environment. Yet while the voyeurism enacted by *Zwischenräume*'s robotic protagonists relies on visual intelligence to recognise changes in the environment, the work defies military logic of suspicious behaviour and rather promotes the machines' capability to seek difference for the sake of being different. As a result, the visual intelligence performed by the sensory image drives the materialisation of the agents' evolving desires, whose disruptive marks and traces, in turn, produce an image of the politically charged relationships they provoke.

Keywords
Machine agency, machine gaze, robotic art, visual intelligence, voyeurism

Introduction
… you turn around in time to see the wall bulge and crack. A hole opens up and you catch a glimpse of a hammer. With every knock the hole gets bigger, blasting out small chunks of wall. You move backwards, your eyes locked on the growing hole–a light shines through, and at its centre you can make out the lens of a camera. You stop. The searchlight sweeps around and meets your gaze. It has seen you, and now it darts off to the side of the hole, as if it is hiding. The wall knocks again, softly this time, three quick taps. The wall behind you responds and then begins to crumble ...

The technologically enabled surveillance regime and its machine vision, is often understood as a remote, disembodied gaze that produces asymmetric ways of looking and visibility (Brighenti, 2010). In our robotic installation *Zwischenräume*, whose curious, self-destructive nature we have introduced above, the machine's desire to look physically affects the environment that it looks at, which in turn affects the ways in which it desires to look. Looking, reflecting and acting become a mutual process that propels the relationship between the machinic inhabitants and their human environment, as much as it does between the human inhabitants of the machinic environment. This paper introduces the transdisciplinary strategies that we've developed to create *Zwischenräume*, with a particular focus on its investigative visual intelligence, and develops the context for a machinic voyeurism to discuss the intricate relationship between the audience and a machine gazing back.

Zwischenräume

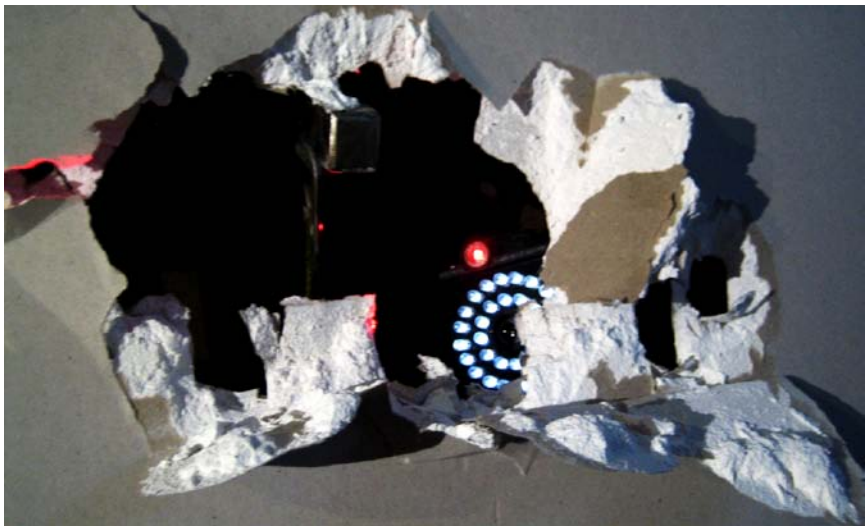


Figure 1: Installation *Zwischenräume*. Copyright: the author.

The installation embeds a group of robots into the architectural fabric of a gallery, as both a sculptural manifestation of and investigative lens into the politics of surveillance. The machine-augmented environment couples walls with autonomous, intrinsically motivated agents, capable of enacting and communicating their evolving desires by re-sculpting their unusual wall embodiment. Each machine agent is equipped with a motorised hammer, surveillance camera, and a microphone to interact with the environment and communicate with the other machines (figure 1). The architecture becomes the medium for the machines to live out their desires, become curious, intervene and signal their accomplices. They develop strategies to survey, provoke, and conspire by knocking against the wall, producing cracks, marks and holes. The surreptitious powers of control and tracking increasingly perforating our everyday life (Crandall, 2005; Haraway, 1991; Lyon, 2006), become visible and tangible, and, like scars, leave trackable traces themselves.

Figure 2: *Zwischenräume* at the MuseumsQuartier Vienna. Copyright: the author

The sculptural practice turns the wall of the gallery into a medium for intervention; and it is

the spectacle of the intervention into the architectural fabric that we are interested in, rather than the intervening machinery alone. For this intervention to be most affective, we need to exploit the audience's ignorance, confusion and curiosity. Ideally, the existing architecture is mimicked to house the machinery that (apparently) breaks through the taken for granted security offered by the familiar wall. In the first show (figure 2) the gallery space was bound by glass walls, requiring us to not only stage the intervention but also the environment to be intervened. The transparent gallery space was turned inside out and presented a private, cosy, living room scene oriented towards the public space outside the gallery. The surveillance machinery attached to the back of the temporary walls inside the gallery transformed the living room scene into a capricious, suspicious voyeur.

Interfacing urban combat tactics and digital surveillance

Zwischenräume looks at the stealthy invasion of digital surveillance through the physical lens of urban combat tactics. Both urban combat and surveillance turn space inside out. In contemporary urban combat, the city and its walls become fluid, a medium to be penetrated, to walk through. Weizman (2006) examines the relationship between architecture and modern techniques, executed by the Israel Defence Force (IDF), in which soldiers were literally instructed to walk through the private walls of Palestine refugee camps. What was referred to as 'inverse geometry' by the IDF, was, in fact, architecture turned into a weapon.

In digital surveillance walls, too, become transparent and permeable to the flow of information, rendering inhabitants within vulnerable to being eavesdropped, identified, monitored and remotely controlled (DeLanda, 1988; Lyon, D. 2006). The project 'Combat Zones That See', developed by the U.S. Defense Advanced Research Projects Agency (DARPA), embeds thousands of cameras into the urban terrain, aiming for surveying and analysing the moves of each resident based on artificial visual intelligence.

Visual intelligence

Zwischenräume enacts the processes (sensing and manipulating) and networks (communicating) of surveillance in an embodied fashion: the practice embodied in the work rejects the use of concealed sensing and communication networks—dominant features of much robotic art—and instead makes them tangible to foreground the political implications of surveillance and machinic autonomy. The autonomy of the machine-augmented environment is driven by the visual intelligence of the robots and materialises the machines' sensory-cognitive negotiation with its environment. Embedded into walls, our robots embody a voyeuristic desire to survey; they are intrinsically motivated to visually explore the environment and study the inhabitants of the space. Movements, colours and faces are processed to create an adaptive model of the surrounds that allows the robotic agents to expect learned behaviours and proactively intervene.

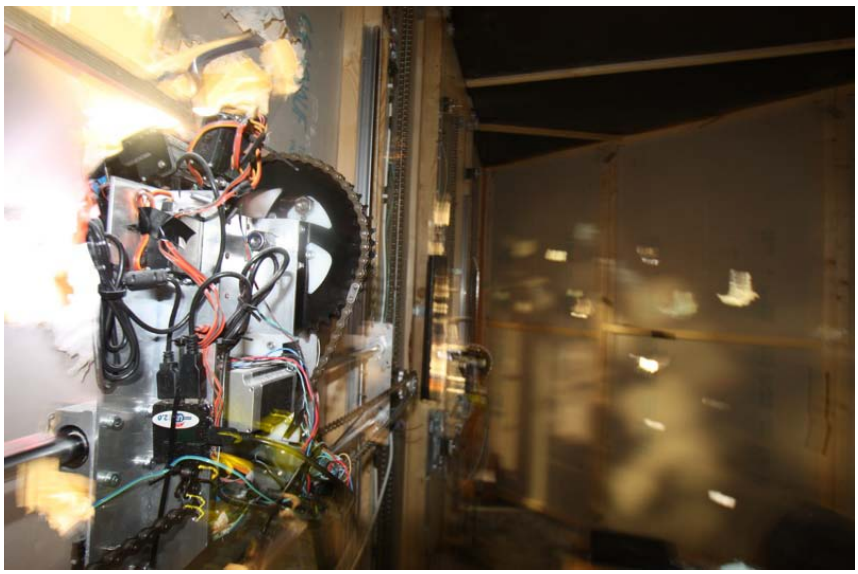


Figure 3: Behind the scenes of *Zwischenräume.* Copyright: the author.

The robotic elements (figure 3) consist of a vertical gantry with a carriage equipped with a camera and microphone, mounted on an articulated arm, and a motorised hammer. The control software for the robots combines technologies and techniques from robotics, machine vision and machine learning. In particular, it combines computer numerical control (CNC) technologies from industrial robotics, low and high-level feature detection from machine vision, and unsupervised and reinforcement machine learning, coupled with a model of intrinsic motivation, to produce an adaptive autonomous and self-directed agency.

The vision system constructs low-level models of the scene using colour histograms to differentiate large-scale contexts, blob detection to detect shapes, and frame differencing to detect motion. In addition, the robots have been given the specific ability to detect faces to direct their attention towards visitors. These perceptual abilities are limited but provide sufficient richness for the learning algorithms to build complex models of the machines' surroundings and to determine what is different enough to be interesting. To facilitate communication without the use of an electronic network, the robots were equipped with microphones to sense the knocking of other robots. In the first installation we programmed the robots with two knocking signals, either expressing excitement (high levels of sustained interest) or frustration (low levels of interest for a certain period of time).

Figure 4: The evolution of 'interesting' changes in the environment. Copyright: the author.

The machine learning combines unsupervised and reinforcement learning techniques (Russell & Norvig, 2003): unsupervised learning is used to determine the similarity between images captured by the camera and reinforcement learning allows our robots to discover strategies for moving about the wall, using the hammer and positioning the camera. The goal of the learning system is to maximise an internally generated reward for capturing 'interesting' images. Interest is calculated based on novelty and surprise by a computational model of curiosity (Saunders, 2001). Novelty is defined as a difference between an image and all previous images, e.g., the discovery of new colours or shapes, and surprise is defined as the unexpectedness of an image within a known situation, e.g., relative to a learned landmark or after having taken a specific action (Berlyne, 1960).
The intrinsic desire to learn about the world directs both the system's gaze and its actions, resulting in a feedback process that increases the complexity of the environment relative to the perceptual abilities of the agent. How 'interest' evolves is depicted in figure 4, showing that the agents' interest is affected by: (a) the positioning of the camera, e.g., the discovery of lettering on the plasterboard wall; (b) the use of the hammer, e.g., the production of dents and holes; and, (c) the interaction of visitors.

The Machinic Gaze

The machinic gaze can be thought of as either prosthetic, that is, a technological apparatus that extends, enhances or proliferates the human eye, or artificial and machinic, that is, cast by a machine capable of 'looking' and 'seeing'. The latter can again be split into 'vision-machines' (Virilio, 1994) whose automated gaze is externally motivated, for instance by a military agenda that defines its targets, or intrinsically motivated—a machine that develops its own object of desire.

Considering the gaze of the machine opens up a view onto the relationship and performative agency between the gazing subject and the gazed-upon (human) audience. This is particularly critical when the gazing subject is in fact an object staring back (Elkins, 1999), and the more complex the more we cannot locate an external, human desire that fuels the gaze. The performative nature of a surveillant agent that looks for the pleasure of looking invokes the notion of a voyeur. In relation to "synthetic images created *by the machine for the machine*" (Virilio, 1994), the voyeuristic machine opens a more playful perspective to Virilio's dark visions of the 'automatic-perception prosthesis' from whose

mechanized image the gazed-upon would be completely excluded. From a Feminist point of view, however, the very notion of 'gaze' already suggests an asymmetric power relationship.

Complicit with the Unwitnessing Gaze

Given our entanglement in both technological evolution and consumerism of the spectacle that this evolution affords us, arguably, the machinic gaze is not only charged with asymmetric visibility but also complicity. The complicit is already an accomplice of contemporary warfare, where "the function of the weapon is the function of the eye" (Virilio, 1989) as well as a media culture that 'affords' us to see the battlefield from the soldier's point of view. It also brings us back to the political agenda of ubiquitous surveillance not only spread across what is declared a warfare zone but also the contemporary city. Speaking of the 'belligerent gaze', Mikkel Bruun Zangenberg heightens our awareness that warfare, where machines increasingly substitute 'real' human soldiers, is constantly in the process of 'unwitnessing':

> "I contend that the one who cast the belligerent gaze, the one who is the subject and master of that gaze, is barred from ever becoming a witness; he may well 'see everything', but since he is always at a safe distance, … he cannot properly turn into a witness. Being the object of the belligerent gaze, on the other hand, is a position of passivity, vulnerability, fear, horror, and suffering, if not being exposed to the numbing effect of alienation and derealisation" (2008).

Zangenberg's 'quasi-machinic obliteration of the conditions of witnessing' not only allows the human commander to command the most in-human from the safe position of a far remote site, but also turns us (usually far remote) citizens into passive spectators of a cruel but safe spectacle. Here the 'eye' that casts the gaze is (still) remotely controlled.

The Machine as Voyeur

What however if the machine's gaze is autonomous and self-motivated? To explore this question outside of the horrific, gloomy, red-tinted drama painted by numerous science fictions and Hollywood depictions, let's retreat from the battlefield for now and return to the artistic experiment of *Zwischenräume*. A machine eye whose way of seeing is motivated by what it sees, expects, and doesn't see could be thought of as an audience to the audience's performance. In this scenario it is not only the machinic wall that performs but also the visitors who by their very presence perform for and entertain the artwork. Rather than serving as the eye for another human agent, it's a voyeur only watching for its own 'pleasure'.

The word 'voyeur' in French means 'the one who looks'. Our machine voyeur does not necessarily invoke the typically stealthy, sexualized and, often, criminalized look, but rather draws on notions of spectacle, pleasure from looking, and power that instils the looker but also the power that the subject of desire exerts on the lookers themselves. Surveillance usually involves an abstract, classification-driven, impersonal form of watching, producing a machine gaze that is always motivated externally. The voyeuristic gaze, on the other hand, is personal and evolves in a reciprocal relationship based on what Brighenti calls spectacular recognition (2010). Both raise uncanny feelings as the technological eye looks back at us, yet while the 'alien' of the technological surveillance apparatus resides in the authority of a remote, unknown, but commonly still human eye behind the ubiquitous technological lens, the alien of the machine voyeur emerges from the machinic and its possible desires itself (particularly the ones we imagine and project onto it).

Figure 5: Captures from the machine–environment of *Zwischenräume*. Copyright: the author.

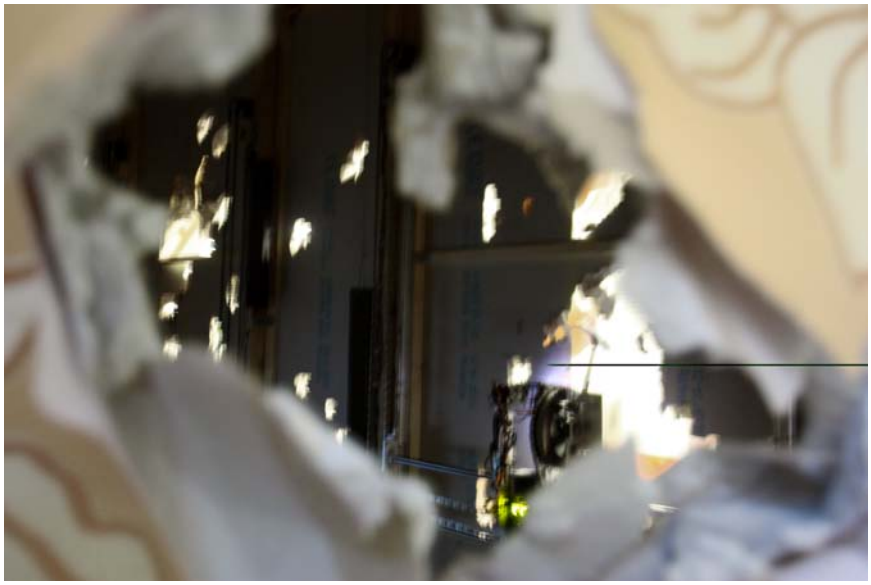


Figure 6: Peeking through the wall. Copyright: the author.

The close confrontation that Zwischenräume stages creates the unusual scenario of a face-to-face encounter that, on the one hand, literally embodies the act of surveillance in a tangible process, and, on the other, destabilizes the asymmetric visibility produced in this control relationship. As the work deploys biometric vision techniques and autonomous visual intelligence, and further empowers the machine with a destructive hammer mechanism to support the wall's voyeuristic desires, it obviously does not aim to trivialize the power of the machine gaze. Rather, we are interested in making this power relationship a personally affecting matter. There is no distance between this gazing agent and the (human) audience; the gaze exchange is immediate and the result affects both 'sides' involved. Interestingly in our experiment, the more we attempt to 'despectacularise' the machine, the more we turn the audience into voyeurs, seeking a glance and peeping through the holes in the wall. The gaze is reciprocal in this (wall)face-to-face encounter (figure 5). In some way it appears as if they both increasingly took on each other's role: the machine-augmented wall turns into a curious spectator of the spectacle outside, while the audience turns into an inquisitive voyeur, peeping inside (figure 6). The installation produces a closed circuit in which the machinic gaze looks back, rendering the spectators witnesses of their own involvement.

Parting Thoughts

The curator of the exhibition *Exposed : Voyeurism, Surveillance and the Camera Since*

1870 Sandra Philips argues that “[s]urveillance pictures are voyeuristic in anticipation, seeking deviance from what is there: the creeping presence of enemy activity; telling changes in the landscape below; evidence of incriminating behaviour, such as spying, crossing borders illegally, or accepting bribes" (2010). While the voyeurism enacted by *Zwischenräume*’s robotic protagonists relies on their visual intelligence to recognise changes in the environment, their motivation to seek deviations defies military logic of suspicious behaviour. They seek deviation from the known, desiring difference for the sake of being different.

The most unique aspect of *Zwischenräume* is that it physically manifests the machines’ voyeuristic desires. According to Canetti, “[t]here is nothing that man fears most than the touch of the unknown. He wants to *see* what is reaching towards him, and to be able to recognise or at least classify it” (1960). According to Brighenti, Canetti is referring to the “*haptic* component of the gaze”, the gaze as social force, revealing the most fundamental movement of power, “the gesture that seizes” (2010). *Zwischenräume* enacts and embodies this transmaterial force and its ‘uncanny touch’ by literally carving the machinic gaze into the fabric of our built environment. Its sensory images drive the materialisation of the agents’ evolving perspective, whose disruptive marks and traces, in turn, produce an image of the politically charged relationships they provoke. The embodiedness of the robots’ abilities to survey and control, forcing them to operate ‘in the clear’, critically exposes the power spectacle of operational media (Crandall, 2005).

The machine-augmented wall also presents us with a whimsical view onto a powerful, autonomous machine, eager to control its environment. It is an image that is probably more accessible when we’re not finding ourselves jumping back in shock of a hammer breaking through a wall, followed by the uncanny gaze of an autonomous eye, or captured in awe of the machine spectacle. Beyond the immediate affect of the wall’s self-destructive process, we see a machinic voyeur with a hammer, slowly but steadily dismantling not only its vision barricade but also its own disguising embodiment. A voyeuristic wall undressing itself.

References

D. E. Berlyne, *Conflict, Arousal, and Curiosity* (New York: McGraw Hill, 1960).

Andrea Brighenti, “Artveillance: At the Crossroads of Art and Surveillance”. *Surveillance & Society*, Special Issue on Surveillance, Performance and New Media Art, John McGrath and Robert Sweeny (eds.), 7.2 (2010): 175-186.

Elias Canetti, *Crowds and Power* (New York: Farrar, Straus and Giroux, 1973).
Jordan Crandall, **“**Operational Media”. Arthur and Marilouise Kroker (eds.) *CTheory* (June 2005). http://www.ctheory.net/articles.aspx?id=441

Manuel DeLanda, *War in the Age of Intelligent Machines* (New York: Zone Books, 1998).
James Elkins, *The object stares back: on the nature of seeing* (San Diego: Harcourt, 1999).

Donna J. Haraway, *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991).

Sandra S. Phillips, *Exposed: Voyeurism, Surveillance and the Camera Since 1870 (*New Haven: Yale University Press, 2010).

Russell Stuart and Peter Norvig, *Artificial Intelligence: A Modern Approach* (Upper Saddle River, New Jersey: Prentice Hall, 2003).

Rob Saunders, *Curious Design Agents and Artificial Creativity*, Ph.D. Thesis, Faculty of Architecture, University of Sydney (2001).

Paul Virilio, *War and Cinema: The Logistics of Perception* (London: Verso, 1989).
Paul Virilio, *The Vision Machine* (Bloomington and London: Indiana University Press and British Film Institute, 1994).

Mikkel Bruun Zangenberg, “Witnessing at War: The Belligerent Gaze”. Frederik Tygstrup, Ulrik Ekman (eds.) *Witness : Memory, Representation, and the Media in Question* (Museum Tusculanum Press, 2008): 315–33.

Compumorphic Art - The Computer as Muse

Dr Ian Gwilt Sheffield Hallam University

Key words:
compumorphic art, art history and theory, transdisciplinary image

Introduction

In this paper I posit the idea that the term 'compumorphic art' can be used to describe an emergent collection of artists and artworks that reference the digital computer for creative stimulus, cultural commentary and aesthetic composition. The term compumorphic art can be thought of as a useful placeholder to describe the relationship between material art and inanimate/digital content in the context of the 21st Century technological/artistic experience. Furthermore, I will propose that compumorphic artworks may refer to not only the visual aesthetic of the digital computer, but often reflect or question the emotion values and ontological qualities we commonly assign to computing technologies. However, the rubric of compumorphic art is by no means resolved - in the provision of a definitive list of artists or artworks. With this in mind I will be describing two recent examples of my own art practice that sit under this term. The works described are concerned with the reconceptualisation of the Graphical User Interface (GUI), by reimagining computer desktop icons in material and hybrid media art forms.

Biomorphism and antecedent movements to compumorphic art.

There is an obvious and enduring tradition in human culture to reference the world around us. This is often undertaken as a means for communicating ideas, and accrediting notions of power, ritual and meaning, in an ongoing expression of the relationship between people and the places they inhabit (Feuerstein 2002:7). The term Biomorphism was coined in the 1930's to describe the work of a collection of artists and sculptors who referenced the organic forms of nature in their artwork. This loosely formed collection included artists such as Barbara Hepworth, Joan Miró, Jean Arp and Henry Moore. The creative referencing of nature seen in the work of these artists frequently went beyond a simple retracing of organic shapes, and through abstraction, often explored the visual characteristics and forms associated with the organic (TATE 2011). We can still see this application of abstracted natural, curvilinear forms occurring in many of the architectural, industrial and product design artifacts of today.

Around the same time the work of artists from the Futurist and Vorticism movements presented an alternative response to early 20th Century environs. Rejecting the natural form, these art movements were more concerned with the impact of the machine age on society and with visualising the speed of modern urban living (Lynton 1981:97). Together with the later 'machinic' forms and affordances of Paolozzi's sculptural works from the 1940s, these creative works can be seen as forerunners to the notion of compumorphic art, in formal if not political terms. They represented a creative response to the technology of their times, demonstrating how the relationship between technology and society could be considered as an appropriate subject matter for artistic works.

The computer as muse

In the 1980s the common method of interacting with computers shifted from the specialist use of computer code command-line inputs to the image-based navigation of the GUI desktop, a paradigm shifted that opened the way for a much broader audience to successfully interact with computing technologies. At the same time the development of

cheap manufacturing processes and advances in computer chip capacity meant that desktop computers began to move rapidly into the home environment. This growth in public use, and the continued rollout of domestic computers created an increased public understanding and awareness of the computer GUI as a visual form. Moreover, with this increased awareness came the potential for creative experimentation.

By the 1990s a select group of artists were actively repositioning the computer interface as a key part of their creative practice (Paul 2003). Through the work of these artists, which included painting, sculptural forms and installations, the media specificity of the screen-based GUI was often broken down by dramatic changes in scale, media and context. The desktop icons of the GUI were disenfranchised from the usual activities of the computer interface, allowing the viewer to reassess their meaning and function. In the move from digital tool to artwork these creative representations of digital technology became precious rarefied artworks that commanded value and prestige (Gwilt 2008). The transdisciplinary act of re-contextualizing the GUI from an operational tool to an artistic form began to problematise our engagement with technology, and allowed the viewer to consider the pivotal place that computer technologies were taking in our everyday social, cultural and increasingly, creative realm.

When we examine the imagery of the computer interface in the context of a transmedia art object we can also begin to look critically at the evolution of the computer desktop metaphor back into material culture. In their book *Remediation: understanding new media* (1999), Bolter and Grusin discuss the idea of the transference of an image from one media to another, and the associated cultural and semantic implications associated with this transference. At the time when Bolter and Grusin wrote their text on Remediation it seemed that all cultural content, past, present, and future was in the process of being digitised into a vast new repository of computer data. Twelve years later, although the digital is now a natural way of thinking about and working with media forms there is a counter move back into the realm of the material. From the analogue to digital remediation of the late 90's we are beginning to witness a reverse flow - the remediation of digital media into analogue forms, and into hybrid analogue/digital constructs which I refer to here as mixed-reality art. This tendency toward the materialisation of the digital is occurring not just in art practice but in other areas such as information visualisation and contemporary architecture, and is facilitated by the development of 3D printing, rapid prototyping techniques, distributed screen and location based technologies.

Accordingly, by moving the GUI (a symbol of computing technologies) across the digital/physical paradigm, and through the hybrid nature of mixed-reality artworks, we engender ontological shifts in our relationship with the imagery of the computer interface (Gwilt and Turnbull 2008). Ron Burnett refers to the potential for multiple readings in any given image as 'image ecologies'. These image ecologies he suggests are based on intertwined, individual, communal and societal relationships, which take into consideration the temporal, social and spatial contexts in which they are viewed (Burnett 2004). These located pretexts set up the potential for multiple interpretations of an image or artifact leading to ambiguities in our reading of the original metaphor. According to Lakoff and Johnson (1980) shifts in values and interpretations continue to evolve as a metaphor is adapted and used by different social groups in different contexts, thereby adding to these original readings. In the context of compumorphic art we are especially interested in reinterpretations of the computer desktop metaphor, in the shift from technological tool, to a symbol of a technology, and to how creative interpretations of the GUI can be fashioned and adapted by artists across and between digital and physical media.

The notion of image ecologies is supported by Bruno Latour, who also advocates the interpretative reading of images, raising questions around the potential for multiple encodings built around any given image or symbol (Latour and Weibel 2002). Latour foregrounds the power of the icon in contemporary society and highlights the multiplying effects that the mediation of a symbol can provoke. Although he uses the term icon in a broader socio-cultural sense, his ideas apply equally well to the computer referencing in compumorphic art. According to Burnett the idea of the 'live' or transformative potential of the image, moves us from the reading of images 'as purveyors of meaning to images as contingent spheres of influence' - interactive, and dependent on temporal and environmental or contextual effects (Burnett 2004: 59). However, the cultural theorist Mieke Bal (2003) contests that real-world artifacts are historically and socio-politically anchored. Accordingly we need to consider the real-world semantic implications for physical manifestations of the digital, and the hybrid spaces of mixed-reality (Gwilt 2009). In these terms the cultural caché of the GUI (as a tool of interaction) resonates in both digital and physical environments. An an agent of democratisation the GUI has invited engagement with digital technologies at a grass roots level, facilitating cognitive interaction in its functionality and usability. How far this functionality can be extended and remain effective in an advanced and distributed technological culture remains in question. Notwithstanding the GUIs association with functionality, the issue of whether or not the mutability of its devices and metaphors can also be used to contest the usual technological and cultural significance assigned to them (when used within the context of art practice and the notion of compumorphic art) is also open to debate. Latour and Bennett's position around the futility of assigning particular meanings to icons in a technologically enabled society opens up the possibility for multi-dimensional interpretations of common symbols, and the collective ability to create, shape and modify those symbols.

The Graphical User Interface as transmedia creative practice

In the last section of this paper I will describe two of my own works, which explore the notion of the GUI as a creative artifact and reinvest new meaning into these everyday computer icons. These works utilise the image elements of the computer desktop in transmedia/trans-image combinations such as: digital-video projections; sculptural forms; audio and rapid-prototyping (3D printing). And represent a practice-based attempt to examine some of the philosophical concepts outlined above.

The first of these works entitled *folderculture*s (2010) continues a body of work which investigates the potential for revisualising the computer graphical interface across the differing formats of digital space and out into a material culture (fig 1). The work explores the metaphor of the desktop folder - through notions of scale, composition, functionality and form, cross-referencing the materialisation of a computer icon into projected and material space. In the piece the digital image of the desktop folder is projected onto an acrylic model of another desktop folder, refolding the image back onto itself across media forms. The refolding is further emphasised through the use of semi-transparent acrylic, which allows the projected image to revisualise on all sides and faces of the model. Weaving together qualities of both interface and material culture, the work creates a special experience; an interface that sits between the computer and physical space. These visual laminates contribute to the acceptance of the digital form as a point of social convergence and a shared technologised visual language.

Fig1. I. Gwilt, *foldercultures* (2010) acrylic, video data projection, metal plinth.

The second piece of work was created at the Japan Advanced Institute of Science and Technology (JAIST), Kanazawa, in 2010. In this work I again use the computer desktop folder as a visual signifier for pervasive digital technology. In this context the folder shapes were used to contest the relationship between aspects of traditional and contemporary culture, in particular around notions of natural and synthetic forms. Based upon the concept of the rock garden (Karesansui) or 'dry landscape' garden, this work looks at the Japanese symbolic representation of nature through landscape (Fig 2).

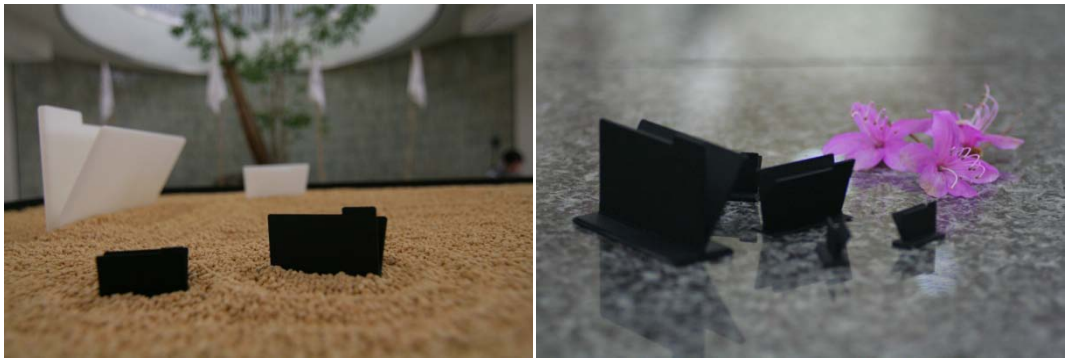


Fig2. I. Gwilt *Folder Garden* (2010), rapid prototype models, plastic, wood, stone, fabric.

However, in this work, the stones, trees and other natural elements are replaced with rapid prototype sculptural models of differing scale and colour. These are carefully placed in raked sand as in the established tradition of the rock garden. By placing rapid prototypes in this context the work attempts to draw a link between the 'combined' fabrication of nature and technology. The fabricated representation of nature as represented by the raked sand is juxtaposed by the plastic models of desktop folder icons an equally fabricated representation of digital technology. Through these contemplative abstractions the audience is encouraged to view the work as both a technological and naturalistic construct, one that incorporates traits from both the physical and technological world.

Both works explore the notion of the compumorphic image and form, and speak to our increasing engagement with computing technologies and the visual symbols of these technologies. Where biomorphic references were once the dominant source of stimulus in creative practice, these digital signifiers point to the increasing influence of computing technologies in the world we inhabit and the way in which we creatively respond to it.

References

Bal, M. (2003). *Is Visual Culture a Good Idea?,* lecture, the Art Gallery of New South Wales Australia. Sydney, The Art Association of Australia & New Zealand.

Bolter, J. D. and R. Grusin (1999). *Remediation: understanding new media*, Cambridge Massachusetts, MIT Press.

Burnett, R. (2004). *How images think*, Cambridge, Mass, MIT Press.

Feuerstein, G. (2002). *Biomorphic Architecture, Human and Animal Forms in Architecture*, Stutgart/London, Edition Axel Menges.

Gwilt, I.D. (2008), 'from digital interface to material artifact', ISEA2008 14th International Symposium on Electronic Art, Singapore, July 2008 in *Proceedings of ISEA2008 - 14th International Symposium on Electronic Art*, ed I. M. Hoofd, M. Tan, K. H. K. Ying, ISEA 2008 Pte Ltd, Singapore, pp. 202-203.

Gwilt, I.D. & Turnbull, D.J. (2008), *mundane_traces essays on transitional art practices*, DAB DOCS, Sydney, Australia.

Gwilt, I.D. 2009) *mixed reality art and the graphical user interface,* unpublished doctoral dissertation, University of New South Wales, Sydney, Australia.

Lakoff, G. and M. Johnson (1980). *Metaphors we live by*, Chicago, University of Chicago Press.

Latour, B. and P. Weibel (2002). *Iconoclash: Beyond the Image Wars in Science, Religion and Art*, Karlsruhe: ZKM, London, MIT Press.

Lynton, N. (1981). *Futurism, concepts of modern art,* N. Stangos, London, Thames and Hudson.

Paul, C. (2003). Digital Art, Thames and Hudson, London.

TATE Collection Glossary, retrieved October 2010, from http://www.tate.org.uk/collections/glossary/definition.jsp?entryId=42

Painting in Transit: A re-mapping of painting's changed terms of reference.

Stephen Little National Arts School, Sydney

This paper addresses image making in its relation to painting within a transdisciplinary context. It examines the relation of nomination, ready-mades, the exemplifying properties of metaphor, characteristic resemblances that exist between different domains, and raises the self-differing aspect of mediums. This paper supports a re-imaging of painting across boundaries that, traditionally, have been 'materially defined'.

Today, painting can be identified across a range of material exchanges, processes, perceptual associations and conceptual relations that accommodate exchanges between painting, and traditionally 'non-painting' contexts, to take place. By exceeding the bounds of painting's material conventions, and extending or problematizing an ontological conception of painting we are presented, associatively, with its re-enactment or re-staging in a different form (the expanded field model).

Painting now exists as a practice or discipline that is no longer bound to its former material conventions. I propose that identifying 'painting' no longer necessarily depends on an ocular-centric interpretation of painting's constitution, especially given that parts of that constitution come from outside of its material configuration.

The four models I address here are, (1) Nomination, (2) metaphor, (3) Wittgenstein's treatise on 'family resemblance', and (4) Krauss's model of a post-material 'vector' where self-differing inner complexities generate their own logics and correspondences that question a conventional interpretation of 'medium' as a materially based support (Krauss, 1999, 26). Collectively, these models show that a medium is not something that can be simply and physically located, but results from a series of alterations, changing correspondences and complex internal engagements.

(1) If we accept that nomination maintains the objective existence of individual and concrete things while attributing the generic and the universal to linguistic conventions, then this can be employed in a pluralist engagement with language and concepts to effect change. This suggests that a language of association, of abstract relations, is already operating to give form to these correspondences and make them visible. One such example is the link between Duchamp's *Bottlerack* from 1914 (a drying device), and his rejection of conventional painting. On the grounds that it links to the tradition of painting through a sensorial engagement with the 'wetness' of paint Duchamp stresses, by association, his need to move from painting's 'sensualised gesturing' (wet) to its conceptual engagement (dry), and what better way to emphasize this shift and give it form than with a drying device.

(2) In *Languages of Art: An Approach to a Theory of Symbols* Nelson Goodman considers the movement of predicates (part of a language that describes the subject) from one realm to that of another. In language, what or whom the sentence is about represents the subject of the sentence. The predicate's role is to modify the subject in a way that tells us something about it, e.g. if the subject is a person named Paul, the predicate modifies the subject and tells us that Paul *ran*. Goodman maintains that metaphor arises through the symbolic function of expression. He maintains that expression, as a process used for exampling or illustrating something, is itself a form of metaphorical exemplification and exists in the relation between a sample and what it refers to (Goodman, 1976, 53). In presenting metaphor as a form of transference, Goodman claims that the application of a

familiar predicate to a new object or context is akin to “teaching an old word new tricks – of applying an old label in a new way.” (Goodman, 1976, 69)

This shows that metaphor facilitates the extension of a variety of correspondences already shown to exist between differently ordered domains. In the case of the *blank canvas* for example, the correspondences register across domains as both painting and non-painting. Goodman’s theories identify and address how nomination and metaphor, as two distinct methods of approach, can be used to implement transference. Here, metaphor facilitates the extension of correspondences already existing between different domains, assists with inter-domain exchange, and accommodates for correlations. The point is to identify genealogical developments forming from a plurality of often, contradictory positions, influence and paradox.

(3) Ludwig Wittgenstein has shown that our understanding of the term ‘relation’ is not always clear. He uses the term ‘family resemblance’ instead to show how a thing we may identify through ‘relation’ might lack distinctive traits. For example one can say 'stand roughly there', and indicate by pointing. The lack of precision used to indicate a meaning does not make the expression meaningless. Wittgenstein claims that it is the way in which a term is employed and how it is understood that are pivotal, rather than any precise meaning (Wittgenstein, 1976, 76-7). Here ‘family resemblance’ is presented as the preferred analogy in connecting particular uses of the same word (e.g. Painting), but it also serves to highlight the lack of boundaries or discrepancies of exactness that characterize different uses of the same concept. If similarity derives from traits of likeness then the lack of set boundaries that characterize different uses of the same concept allow for correspondences to occur. This shows that a correlation exists between Wittgenstein’s appeal to similarity, and Goodman’s view that a language of association, of abstract relations is already operating to some extent to give form to these correspondences and make them visible.

To show this in real terms I have chosen to draw on an encounter I had a few years ago. The encounter took place in an exhibition of paintings from different styles and periods. Scanning the show, my eye was drawn to an empty space on the wall between two paintings. Closer inspection showed tiny holes indicating that a painting with four mirror plates had been removed – or had it? I felt a certain conceit in the surety that came with this assumption. How many times have individuals mistaken power points and fire hydrants for art, and if it were not a joke on the viewer, then who would propose a piece like that in a group of paintings such as these whose genealogy spanned decades? The answer seemed obvious: I would. This moment became a valuable lesson, not about what painting *can* offer, but crucially, it spoke about what conventional forms (i.e. the paintings on show), albeit seen here from a particular perspective, can fail to offer painting. Letting such a failure pass unchecked would amount to sanctioning that failure, and abandoning critique. A blank space between paintings (a readymade space) had offered a more fulfilling and informative encounter with painting than any of the works on show.

This episode momentarily highlights painting’s Omni-present physicality, and its ability to slide between different physical and perceptual modalities. What is revealed here is a vital infrastructural understanding of painting today that, far from remaining static, has continued to extend and develop itself over time. This also signals the unfolding of a specific mythology of painting that offers the potential for appropriation and extension. I propose that this infrastructural development originated from perceptual shifts highlighted in the first instance by blank monochromatic painting, and was extended by the idea that a blank readymade canvas could be classified as painting, or at the very least as a generic

signifier for painting. I suggest that while some of these associations already exist (e.g. a blank, readymade, stretched canvas = painting), that others are still finding form. While both paths rely significantly on aspects of contingency and cultural memory, one approach seems to favor a desire for immediacy (i.e. physical, material, literal) that corresponds to a particular or traditional understanding of what agency is, and does. Another approach reveals itself on a perceptual level by first noting preliminary corresponding states or presences. In short, I am saying a particular correspondence between an everyday thing and painting can be arrived at perceptually. Here, perception proceeds in the first instance through 'seeing'. It is *after* this that the perceptual experience, by its extension, invites further clarification and conceptualizing that draws on historical and theoretical positions. This seeing can take the form of the so-called space or place of painting (e.g. the wall, the frame, surface etc) but it also connects with a variety of other associations that link to painting in other ways. This shows that a preliminary perceptual identification of sorts can take place before the 'idea' is brought to mind and played out. I suggest that the 'bringing to mind' of the idea is, in the first instance, instigated on a perceptual level by associative insight. This suggests that the idea that the blank canvas exists merely as a conceptual and theoretical exercise, whose actualization in practical terms has arguably never been fully realized, deserves to be re-examined. Is it enough to say that the blank canvas scenario, if that's all it really amounts to, is now valueless and deserves to be relegated to the past? Or has it managed to maintain relevance and currency by taking the form of a specter of sorts that accords a real, experiential sense of presence. I mean by this that there are instances where it seems that painting is no longer necessarily bound to the canvas, or for that matter to the traditional understanding of painting as a medium. There have been shifts made to its constitution that have specifically focused on the works' interior and exterior space, the use of paint, lack of paint, the substitution of colour for paint and from the framing edge of the work itself to the space it occupies on the wall or floor. Collectively, these small acts, different processes and forms of presentation come together within a much larger sphere to generate what we see and to question the criteria used for its classification.

The pictorial space that the 'blank' now inhabits (e.g. the blank space of empty billboards in a busy street) often conjure abstract moments of specific peculiarity suggestive of a more complex position. This is where painting's traditional material and physical limits do not sufficiently support the requirements of this new dialogue, its different presentational mode, or collectively what these may propose or represent. This new physicality comes to us in our engagement with the everyday in the form of associative visual hooks or codes that by-pass the use of traditional painterly materials altogether. For all intents and purposes this physicality has been transferred into the world around us where its tangible presence still remains, and on occasions catches our attention and momentarily re-focuses our gaze. The presence I am referring to here is not that of painting understood in a conventional sense as a single reified physical entity e.g. paint on canvas, but rather one that proceeds from a plurality of associations and overlaps between different objects and their corresponding scenarios. Such scenarios suggest something more akin to a kind of 'Omni-present' physicality that periodically appears in blank billboards as mentioned above or, in relation to my own studio practice as mirrors, actions, or vacuum cleaners etc.

(4) In her text *A Voyage on the North Sea* (1999), Rosalind Krauss claims that a medium's specificity cannot be simply collapsed into the physicality of its support. She presents it as a separate, diverse and complex interlinking of structures and conventions that are distinct from material properties and physical supports. Through this she argues for the idea of a differential specificity, one that is aggregative and heterogeneous (Krauss, 1999, 53). Collectively, 'painting' entails more than just its material attributes. It includes recourse to

other contributing inclusions such as fiction, reality, symbolism, subjectivity, metaphor, simulation, allegory or exemplification etc. Such factors posit painting as a 'practice' whose configuration derives from its own self-differing inner complexities, what Krauss refers to as 'phenomenological vectors' (Krauss, 1999, 26). These function as a diverse and complex interlinking of structures and conventions that are distinct from material properties and physical supports. They generate their own relationships and logics, and question the validity of 'medium' understood as a materially based support.

So what concrete examples are there that do not merely stand-in for the space of painting but show it to be an active space that extends the very conception of how painting, albeit in an abstract sense, can be seen to function? It would be easy to fall back on the blank canvas in this instance but it seems that even this would not do this point justice. The controversy surrounding the scenario of the blank canvas brought about change, this much is true. The value in this though is not just *what* the blank canvas signifies but the passage that has been opened for painting by this signification. It seems that in this instance the issue seems less to do with the blank canvas itself (i.e. the 'historic vehicle' of this signification) and more with the extension of its received message into new forms and dialogues within and around painting, i.e. the signified 'place' or 'space' of painting. I propose that it is in response to factors such as these that the materialization of the blank canvas has, with a few notable exceptions e.g. Fontana, remained all but unrealized. This is not to say that it can't or shouldn't be realized, only that such an act runs the very real risk of appearing gratuitous.

For the sake of clarity I have chosen to reference works or situations that might normally be considered as lying outside of painting. That is, situations where painting is generally deemed as being absent. The trip to the Museum that I mentioned earlier is one example. Another can be found in the work of Nouveaux Réaliste artist César Baldaccini (1921-1998). Generally known as César, he gained notoriety by using crushed parts of old automobiles and his wall-hung work *Relief Tôle* (1961) is unmistakable in its reference to painting. Here, the work's overtly formalized (pictorial) presentation – suspended as it is on a stretcher frame, effects a mirroring that recalls abstract painting in shape, colour and composition. The emphasis the composition places on the side of the work (the stretcher's edge) by restricting its activity within the formal limits of the material support echoes and exemplifies this outer edge as if to say that this boundary is to be respected. Metaphorically, it is not just the imagined space of the canvas that is exemplified here. This is the space of *any* canvas in that it becomes a zone of specific activity and signification that invokes, accommodates and sustains a discourse with painting through the designation and exemplification of a number of painting's properties or familiar characteristics. Perceptually, this visual indicator lends a more physical and tangible sense of presence to the proceedings. This heightened state of direct association effectively amplifies the level of visual quotation that exists here and links the thing we are 'looking at' (here, car parts) with another thing altogether that we are already 'seeing' - the acknowledged space of painting. So what was originally only associatively symbolic in its use of metaphor now becomes visually apparent and physically present. I propose that this signals a significant affirmation of how a semi-de-materialized aspect of painting can be accredited with inhabiting real space through another's form. This exists in the first instance as a visual 'hook', the *seeing* of which instigates a perceptual correspondence with the known space of painting. Similarly, I propose that this visual zone or spatial vector's 'hook' is an extension of the blank canvas's role of standing-in for what is absent, and that this phenomenological zone has been developing continuously since the 1960s. So where the scenario of the blank canvas was originally understood as being just that, a theoretical scenario, I propose that an acknowledgement of these properties, as and when

they show themselves, actually credits this phenomenological zone with moments of tangibility that argue against the view that it is a purely theoretical proposition. The bottom line then is that it grants these semi-dematerialized aspects of painting a tangible, physical presence that is identified and singled-out in the first instance by *seeing*, and on this count it is more than just theoretical.

A painting retains traces of the different processes involved in its creation. Some of these processes are present in the making (physical) while others present themselves in the activity of choosing (conceptual) but all exist as part of the constitution of its making. As such, painting's re-constitution as an enterprise that should not necessarily depend on paint, represents the activity, understood here as 'discipline' or 'practice', as a somewhat differently configured entity and one that is constantly open to change. It is my belief that these constituent elements are open to variation and that they offer potential for the constant reconfiguring and renewal of these variable elements while retaining and exemplifying their disciplinary embodiment as painting. I posit the plausibility of painting being understood as a 'discipline'. As such, it would no longer be reliant on the idea of a self-regulating medium in regard to the work's material constitution. Instead it can force such ideas into question to the point where the use of paint itself is marginalized, or made to appear unnecessary.

This paper effectively questions conventional terms of reference i.e. the material traditions or common denominators that historically, have informed and arguably entrenched specific art forms. I contend that terms such as 'disciplinary definition' (as noted in the call for abstracts), are now too unspecific, misleading, and at worst prescriptive. How do we choose to define discipline, under what terms, and whose agenda? While supporting a re-apprehension of the image, this paper stresses the folly of viewing disciplinary boundaries today as markers of an outmoded, materially led ideological framework. The folly of this is highlighted by the notion that, as a discipline, painting today is no longer bound to its former material tradition, a tradition that, until the twentieth century, had historically informed its terms of reference. The acknowledged *'boundaries of disciplinary definition'* rests, I believe, on an outmoded idea of discipline, evades the bigger issue of what the term discipline may now entail and echoes, or at very least appears to condone, a more essentialist view of disciplinary boundaries (Greenberg?).

References:

Baldacinni, César (1961) *Relief tôle*.

Assemblage of pieces of automobile bodywork mounted on a frame.

[Internet image]. Available from

<http://artintelligence.net/review/?p=497> [Accessed 1st November 2008]

Goodman, Nelson. (1976). *Languages of Art: An Approach to a Theory of Symbols*, second edition. Indianapolis: Hackett Publishing Company.

Krauss, Rosalind E. (1999). *A Voyage on the North Sea: Art in the Age of the Post-Medium Condition*; London: Thames & Hudson Ltd.

Wittgenstein, Ludwig. (1976). *Philosophical Investigations*. Edition 3. Originally published 1953. Great Britain; London, Billing & Sons.

Imaging affect: abstraction and the echo of the unknowable

Dr. Daniel Mafe Queensland University of Technology

Abstract
As an artist my primary interest is in the abstract, that is in images of the imageless. I am curious about the *emergence* of pictorial significance and content from this unknowable space. To speak of the significance of an imageless image is also to speak of its affect. I aim to explore this both theoretically and practically. Theoretically I will explore affect through the late work of Lyotard and his notion of the affect-phrase. This is an under-examined aspect of Lyotard and demarcates a valuable way to look at the origins, impact and ramifications of affect for art. Practically I will apply these understandings to the development of my own creative work which includes both painting and digital work.

My studio practice moves towards exploring the unfamiliar through the powerful and restless silence of affect. In this intense space each work or body of work 'leaks' into the next occasioning a sense of borderlessness, or of uncertainty. This interpenetration and co-mingling of conceptual and material terrains combines to present temporal and spatial slippages evident within the works themselves and their making, but it is also evident in bodies of work across the chronology of their making.

Through a mapping of my own painting and digital arts practice and the utilisation of Lyotard's notion of the affect-phrase I aim to describe the action of this 'charged emptiness' on creativity and explore and explain its significance on that we call image and its animation of what we call critical discourse.

Keywords
abstract, affect, art, image, Lyotard

Introduction
As an artist working with abstraction, image has always been a dynamic thing for me. I seeimage as an appearing – where the image presents as an event. In this respect image can be understood as something oscillating between being an affecting shape and one that signals the emergence of the conceptual. Here image is abstract, something unknowable and invisible. It is that thing which generates or transacts information and is not to be understood as something directly representative of information.

In an article from 1990 on the re-emergence of abstract painting, Barry Schwabsky reiterated Rosenberg's characterization of the painter's canvas as a delimited space in which an *event* takes place and then went on to suggest that this event in painting is the "appearance of a disappearance". Painting here is described as a self-consuming artifact that destroys or undoes itself in being seen. He linked the then contemporary abstract painting of the eighties, to a tradition in painting that he considered had evolved to a position of critiquing painting's ontology. Contemporary paintings active in this way were then characterized as evoking that tradition poetically as "a silence in which the memories of many paintings murmur". (Schwabsky1990)

In this sense painting is understood dynamically, as a self-cannibalising image – in revealing it disappears. It is a vanishing mediator. How does one interact with or makes sense of this kind of presentation? I suggest that affect is the key. Affect occurs in the silence which governs the absence of knowing. An absence of knowing is an absence of clear naming, that is of language. From the affect occasioned by silence we generate thinking. We respond to this silence affectively and in such a way that meaning emerges.

Jan Verwoert, a critic and curator has commented that,

> “There is something provocative about the insistence on remaining abstract. First of all, *abstraction* is the opposite of *information.* ...True abstraction creates a singular experience of suspended meaning, the exhilarating sensation of the horizon of perception opening up and the mind reeling as new ways to see, think, and feel become tangible.” (Verwoert 2008, 92)

Verwoert is talking here about potentiality or latency. In this paper I aim to explore this both theoretically and practically by exploring the relationship between silence and affect. Practically I will explore the generative significance of silence embedded within my studio practice which includes writing, painting and digital work because it is in my studio practice that I move towards exploring the unfamiliar through its unruly affecting silence. In this intense space of making each artwork or body of work 'leaks' into the next, occasioning a sense of borderlessness, or of uncertainty throughout the work as a whole. This interpenetration and co-mingling of conceptual and material terrains combines to present temporal and spatial slippages evident within the works themselves and their making, but it is also evident in bodies of work across the chronology of their making. And this dynamic is interesting in terms of what it may mean for image.

Theoretically I will explore affect through the late work of Lyotard and his notion of the affect-phrase. While this is an under-examined aspect of Lyotard it nevertheless demarcates a valuable way to look at the origins, impact and ramifications of affect for art. My aim then is to describe the action of the “charged emptiness” of affect on creativity in general and explore and explain its significance on that we call image and its subsequent animation of what we call critical discourse.

Description of Studio Practice: Sites of Abstraction, Diagrams of Need

My work uses abstraction to generate complex visual experiences centered around time, painterly gesture and abstract visual fields. There is always an intense feeling-tone or mood to the work, which though ambiguous and hard to define is insistent and impossible to ignore. It is generated in the first instance through the exploration of a range of complex visual experiences built upon disruption or interference. These disruptions complicate the visual experience and generate odd or misplaced feeling-tones, which are hard to identify. This affect begins to define the broader concern of the work as a whole.

As my work has been actively concerned with abstraction as a practice - that is, as praxis - it has necessarily explored what abstraction is as an image. To paint abstractly now is necessarily to engage with abstraction as a historical genre. The use of a prior image of abstraction can provide painting possibilities to be either adopted, quoted or flirted with,. It can therefore be considered one of the key visual systems that can be subjected to disruption, in which the image of abstraction can be reworked and remade. Additionally, my works record the actual making experience as traces which reveal themselves slowly to the viewer. In the digital animation works, this temporal revealing is mapped and explored more explicitly through looping. All of the works, both digital and painterly, compress visual experience into a contradictory and ambiguously shifting space, flirting with the viewer's perception and memory by challenging and then deconstructing recognition.

That said these descriptions of the work don’t go far enough. Something important is not being said or addressed here. For example, I am confronted by and confused by the gap between my experiences of making and then of viewing the work and also by the range of motifs across the separate bodies of work. All are in open flux. On reflection it emerges that both the motifs of my work and the evidences of their making all constitute motifs of origin and infancy, or rather the infancy of the event. This becomes clearer if I consider the

work in relation to the event as described by Lyotard as the moment of *happening*. For Lyotard it is that moment of sublimity where one is confronted with the terrifying awareness that nothing is happening and yet something does happen – it is that moment of the about-to-occur that is the event.

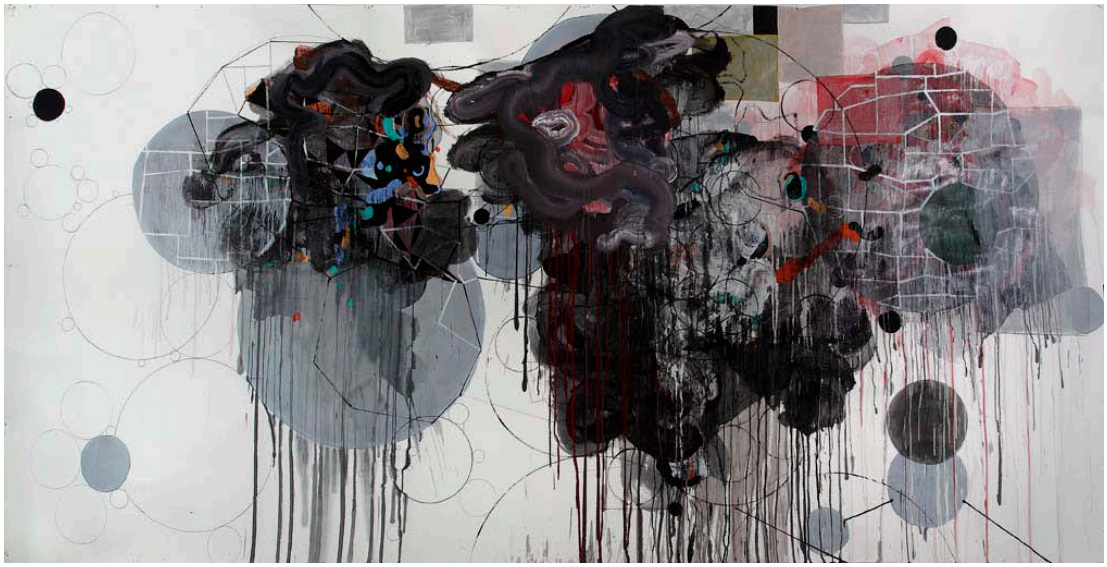


Figure 6 **Daniel Mafé, *Rose of my Desire: Beginnings,* 200x420cm, mixed media on paper, 2009.**

This perspective of the infancy of event in my practice and I believe in all abstract art, exists on three levels. The first is at the level of the motif. The motifs of my work, which include fundamental geometric forms like the circle and the square, raw painterly gesture and smears or pours, as well as occasional images of children's toys and cartoon heads, are literally different kinds of pictorial representational gestures towards beginning or infancy.

The second occurs within the visual dynamic of the work itself where movements of coming together and falling apart are orchestrated into a looping continuum. These movement are replicated or echoed within each work, each body of work and then again across bodies of work. What is being constructed is effectively that which performs as a continuum of starts, of beginnings.

Finally, for a long time I have stumbled through an experience of silence in the making phase of my creative practice. The same is often true for speaking about it. I need to emphasize that this is not just any silence. It is particular and it is intense. It eradicates any sense of "I", any sense of "place" for being. It has been, and remains, a humbling experience. It is as if the artwork I make emerges from this silence, while at the same time the silence seems to arise from the making process itself. Known things flicker in and mostly out of existence and I am compelled to abandon them as irrelevant to the act at hand. My practice is now something I have to conjure an entrée into or invent anew. Goals, intentions and expectations may have no substance or credibility. I am unable to remember or re-inhabit the experience of making previous work. There is no map here; I feel abandoned, not in the making, but to it.

Figure 7 **detail, from *Rose of my Desire: Beginnings.***

In this state I know only what my art practice might mean from moment to moment. The clarity of meaning or sense of discursive coherence disappears. The silence acts to return me to the profound sense of beginning once more. I want to point out here that the works are not expressive of me, nor are they a catharsis. In their profoundest sense the paintings are empty, and so am “I”.

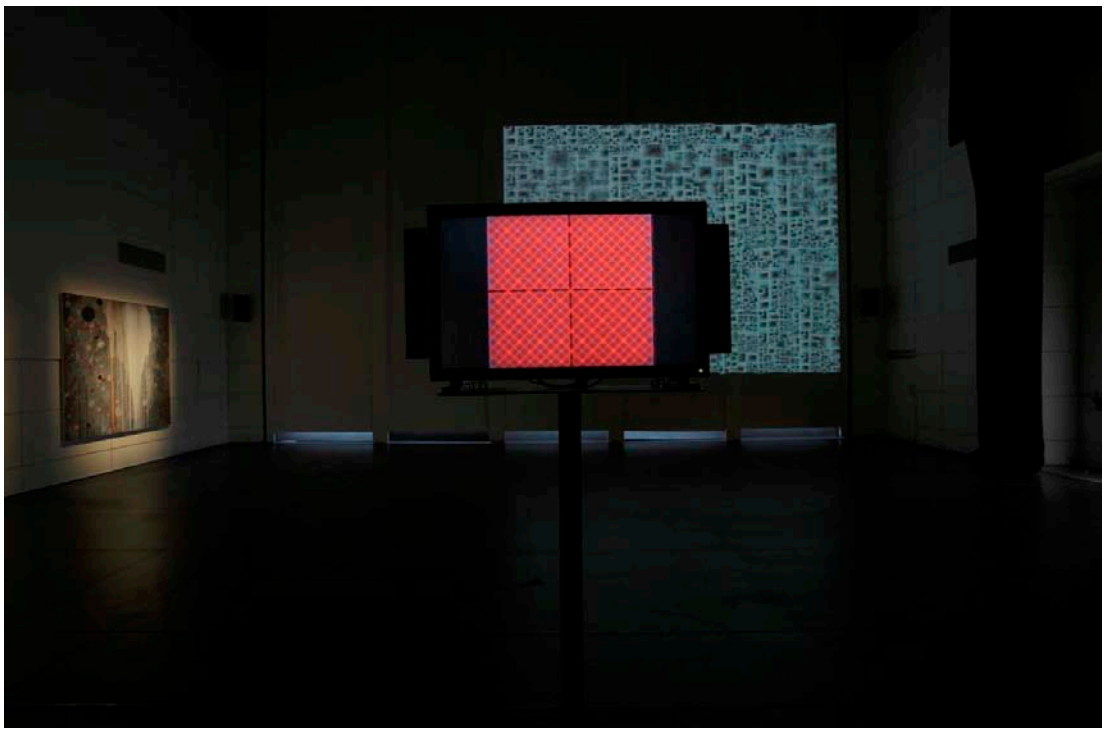


Figure 8 **Installation view, *Sites of Abstraction*, QUT, The Block, 2009.**

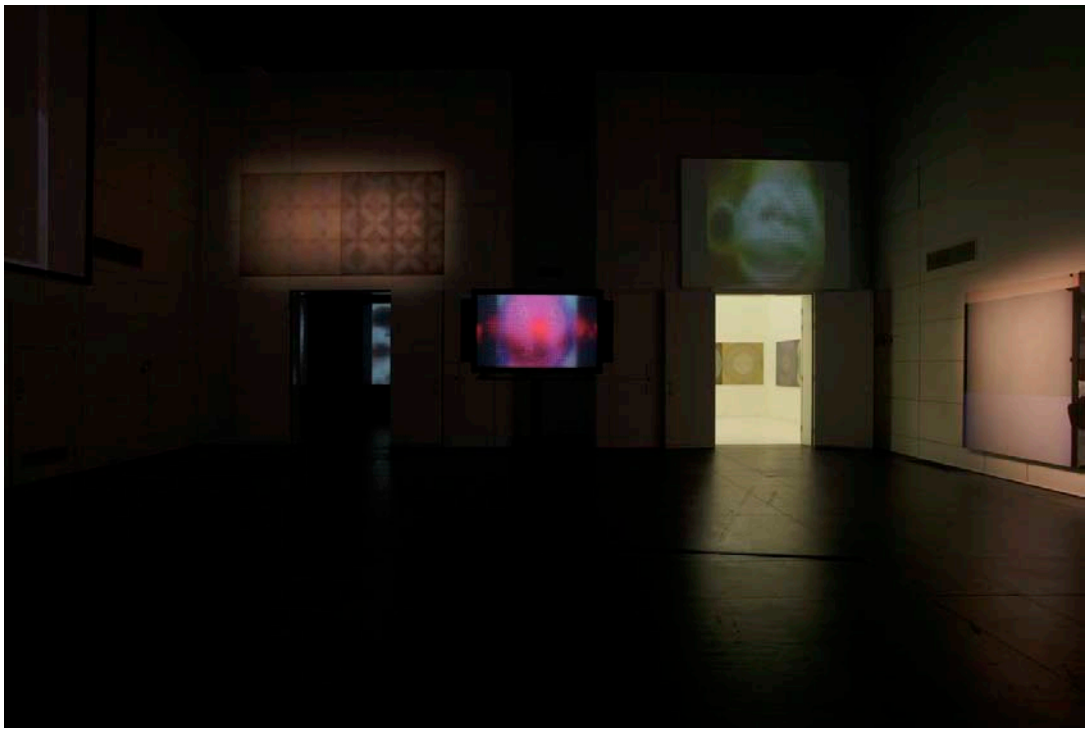


Figure 9 **Installation view, *Sites of Abstraction*, QUT, The Block, 2009**

I have spent time mapping this silent experience or empty state because it is foundational to my practice, and seems to exist both within and separate to my practice. My practice continues to grow from this “cut” or “blank” in itself and meaning is generated from it. I am not though actively expressing or representing silence; it announces itself. It is important to stress that I am not discussing the *agon* of creative making in the sense of any “romantic specialness”. I am not sentimental about this experience or state and it doesn't act to

produce transcendental truth, rather the silence produces and announces its own happening. It is its own event, its own occurrence.

In this respect silence must be understood as not simply the opposite of speech, as speech's absence but as something more dynamic and positive in the Heideggerian sense where silence needs to be understood as something constitutive of discourse – in other words for one to be silent one must have something to say. (Zembylas and Michaelides 2004, 193) To better articulate this point I need to discuss the relation between silence and affect. As previously stated this question is related to affect as interpreted by Jean-Francois Lyotard in his affect-phrase.

Lyotard, the affect-phrase and art

Lyotard's views and descriptions of affect describe affect's relationship to silence and also begin the elucidation of why artists and other viewers feel the need to explain artwork and processes of making.

In "The Differend" Lyotard developed a theory of communication based on what he called *phrases*. It is important to understand that the phrase, while considered the fundamental unit of communication for Lyotard, is not specifically a linguistic construct. For example Anne Tomiche, writing on Lyotard's affect phrase explains:

> "The 'phrase' is what Lyotard … offers as the elemental unit of analysis. … Lyotard's phrase is not the linguist's sentence: it is not a minimal unit of signification or the expression of thought. A word as well as a sentence can be considered a phrase: nonlinguistic units such as gestures, silences, signals, notes of music also constitute phrases." (Tomiche 1994, 44)

Within this understanding feeling is also a phrase for Lyotard although he differentiates it from how a phrase typically functions.

> "Feeling is a phrase. I call it the affect-phrase. It is distinct in that it is *unarticulated*. … A phrase is articulated to the extent that it presents a universe." (Lyotard 2006, 104)

To understand this differentiation we need to look further into the makeup of the phrase and so understand how a universe is presented. For Lyotard phrases are understood to set up links with one another. A phrase is therefore not defined in terms of meaning and signification rather it is a pragmatic entity that is defined by, yet also defines, the situating of its instances with regard to one another. (Tomiche, 44) Where this cannot happen, a silence occurs: this silence is called by Lyotard a *differend.* For Lyotard this silencing is the product of the inability of two phrases to form a link. (Lyotard 1988, xi)

The affect phrase therefore is unarticulated because it does not present a phrase universe. Indeed it only signals itself as meaning and a very limited meaning at that, one indicating only pleasure and/or pain. Lyotard goes on to list three significant consequences that follow from the fact that the affect-phrase is unarticulated: first, the affect-phrase doesn't appear to allow itself to be linked with, according to the rules governing any genre of discourse and consequently it is only able to suspend or interrupt linkages; second, the affect-phrase through this interruption creates a damage for the rules of discourse; and third, this damage is transformed into a wrong suffered by the affect-phrase. In other words, "the articulated phrase and the affect-phrase can only 'meet' in missing each other." (Lyotard 2006, 105)

This quality means that affect has the capacity to disturb articulated discourse, to damage it by injuring or violating the rules of the genres of discourse. It stops, albeit briefly, any

discursive momentum. At some level, we can recognise affect, but we are forever destined to not articulate it adequately, and yet we cannot stop speaking of it. In “The Affect in the Work of Jean-François Lyotard,” Ron Katwan says:

> “The affect is an experience without content. It indicates to the mind that something has happened, but not what has happened. It could be said that it bears witness to the event of a phrase, that is, the taking place of an experience, without being able to speak of its nature.” (Katwan 1993, 14)

Despite its discursive silence, how does affect as an inarticulate phrase, communicate? Lyotard contends that articulate discourse appears to both demand articulation from the affect and supply it itself. (Lyotard 2006, 106) Articulacy seems unable to tolerate the loud silence of the affect. Affect occurs in silence, or as silenced, because it is pre-discourse. It can be said to disturb, interrupt or *damage* discursive explanation or movement and animate from “beneath” the sound, shape or forms of discourses.

In other words the affect-phrase haunts discourse. Clare Nouvet in “The Inarticulate Phrase” (2003) explains:

> “…affect is, according to Lyotard, 'irreducible to articulation.' … It can inhabit articulated language, but as a squatter, a clandestine guest, an 'outside within,' the presence of which articulated language does not even suspect or hear.” (Nouvet 2003, 239)

Affect haunts and disrupts the coherence of discourse but can never be heard in its own right. And yet, discourse serves the affect-phrase by revealing the event, it is the *happening* which points so clearly to the terrifying nothing from which it provides relief. For the disruption of discourse to be evident one needs to attend to the subtleties of how affect may be animating the discourse. In art this is apparent in how the silence of affect generates or animates the indeterminacy of art, that is its resistance to being interpreted definitively. Clare Nouvet comments on the power of, but equally the frustration for discourse (logos) in dealing with affect's indeterminacy:

> “Within logos, the testimony of the affect is therefore doomed to be judged both irrefutable (it is indubitable that there is an affect) and equivocal ...the affect is a witness which can neither be heard nor speak according to the rules of logos.” (Nouvet 2003, 238)

And so, the painful/pleasurable silence that is affect, generates possible interpretations. Art is involved in this process as both a result of affect and affect's generator; this seems to be art's value. Yet clearly nothing can present the unpresentable. All that can be done is to indicate that there is such a thing and to bear testimony to its existence.

Lyotard touches on this theme in “Soundproof Room”:

> “Painting is not for seeing; it demands this listening: the eye listens to something beyond the harmonious music of the visible. … The outer form of the work, the artwork's facies, seems to doom it to mere simulation, dissimulation, lying. But its empty inside allows the mask to pick up the truth – nothingness – in the form of strident apparitions.” (Lyotard 2001, 102-104)

This silence is a voice for which there can be no discursive equivalent. And yet it demands articulation. There is nothing to say and it is difficult to say *nothing*.

Imaging affect

I began this essay speaking of image as event. It is an event that images painting’s disappearance. How? It does so by reflecting the silence which births affect. Lyotard describes the silence as the result of the inarticulate phrase. One can though, go one step

further. Affect is born of a silence that has its roots in the nature of materiality within art. It will be useful to turn to Blanchot for further insight because for Blanchot, “Art *is* unused, unemployed and idle matter. Art is … the image of matter.” (Wall 1999, 69), because, as Thomas Carl Wall explains,

> “No one *sees* the uselessness of matter. One sees material *for* this or that. Materiality *itself* harbours its own invisibility. This is its obscurity. In its uselessness, unclothed by forms, it withdraws from perception.” (1999, 70)

In this withdrawal, nothingness becomes visible, that is when “everything disappears, disappearance itself ‘appears.’” this is an antecedent to Schwabsky’s assertion that in painting there is the appearance of a disappearance. It is materiality’s very uselessness that makes art possible. An example would be in poetry where the material abstract musicality of word is used as well as and sometimes despite its actual meaning. Or in painting where the gestures of Jackson Pollock render the materiality of the paint used visible. Here art images the material, which is the absence of use or of discourse. Material is visible but inarticulate, that is resistant to discourse but capable of generating discourse through the affect it generates. Materiality is the medium for the communication of affect. It is through materiality that affect haunts discourse. In this way art is also the image of affect. As image art is a meeting place for matter and affect and through this compound generates or insists on the generation of meaning. Here image is as event where to see or perceive is to do. And what is done is meaning.

Jill Bennett in her wonderful book “Empathic Vision” quotes Deleuze on Proust (Jill 2005, 7),

> “More important than thought there is what ‘leads to thought’ … impressions which force us to look, encounters which force us to interpret, expressions which force us to think.”

This is what image does though the agency of affect. As a subtly complicated phenomena image presents itself as appearance and is therefore in itself empty – it is strangely and powerfully, void.

References

Bennett, J. *Empathic Vision: Affect, Trauma and Contemporary Art*. Stanford: Stanford University Press, 2005.

Katwan, R. “The Affect in the Work of Jean-François Lyotard.” *Surfaces* 3.13 (1993). Accessed 13 January 2009. http://www.pum.umontreal.ca/revues/surfaces/vol3/katwan.html.

Lyotard, J.-F. *Peregrinations : law, form, event*, The Wellek Library lectures at the University of California, Irvine. New York: Columbia University Press, 1988.

Lyotard, J.-F. *Differend : Phrases in Dispute*. In *Theory and History of Literature.* Minneapolis: University of Minnesota Press, 1989.

Lyotard, J.-F. *Soundproof Room: Malraux's Anti-Aethestics*. Translated by R. Harvey, *Cultural Memory in the Present*. Stanford, California: Stanford University Press, 2001.

Lyotard, J. F., K. Crome and J. Williams. *The Lyotard Reader and Guide*. New York: Columbia University press, 2006

Nouvet, C. “The Inarticulate Affect: Lyotard and Psychoanalytic Testimony.” *Discourse* 25 (2003): 231-247.

Schwabsky, B. “Abstract Painting in the Late 80's.” In *InLiquid ~ Lawrence Oliver Gallery Essays*. (1990). Accessed 24 March 2008. http://www.inliquid.com/thought/articles/mangel/abstract.php

Tomiche, A. “Rephrasing the Freudian Unconscious: Lyotard's Affect-Phrase.” *Diacritics* 24 (1994):43-62.

Verwoert, J. “The beauty and Politics of latency: on the Work of Tomma Abts*”* in *Tomma Abts* by Bruce Hainley, Laura Hoptman and Jan Verwoert. London: Phaidon, 2008.

Wall, T. C. *Radical Passivity: Levinas, Blanchot, and Agamben*. Albany: State University of New York, 1999.

Zembylas M. and Michaelides P. “The Sound of Silence in Pedagogy.” *Educational Theory* 54 (2004):193-210

Syzygy: gazing at shadows, darkly

Harry Nankin RMIT University, Melbourne

Abstract

To consider an 'ecological gaze' at a time of the putative 'end of nature' is to engage in "dark ecology" , a mournful attendance to global ecological destruction, the collateral termination of the moribund ontological binary 'man/nature' and the concomitant decay of spatial ecological identity. To uncover an ecological gaze *photographically* is to bear witness to what might be characterized as ecological 'tragedy' for which the germane ocular trope is not a morbid iconography revealed by reflected light but an elegiac index of shadows, and not distancing monocular hubris but a visceral chiasm of binocular seeing, photo-kinetic action and photo-chemical reaction. Such was the rationale of *Syzygy*, a project about Lake Tyrrell in the Victorian Mallee. Lake Tyrrell was reputedly once an indigenous celestial observatory. The heavens mirrored in its shallow waters informed a sacred reciprocity of sky with country, reciprocity long since ruptured. *Syzygy* reflects upon this sacrament and its loss by turning the lake's surface into a photographic focal plane that no longer reciprocates the heavens. This estrangement between heaven and earth is indicated by imagery created literally by exposure to starlight falling on the lakebed on moonless nights. The resulting heavenly shadows trace live invertebrates and reptiles gathered from the lakeshore and rare astronomical glass plate photographs brought to the location. *Syzygy* was a collaboration with scholar/artist Paul Carter, astrophysicist Maurizio Toscano and many volunteers. The process was organised on-line and documented on video.This paper locates *Syzygy* within contemporary art practice by addressing how this groundbreaking 4-year experiment revivifies analogic methods as an arena for speculative research and critique, transforms appropriated scientific data into affectual imagery through remediation and reframes environmental art as politics in a transdisciplinary context.

SYZYGY

1. Lake Tyrrell

At first sight Lake Tyrrell in the semi-arid Victorian Mallee is unprepossessing. Yet, this stark, seasonally-filled saltpan surrounded by eroding sand hills and grassy plains is associated with a pre-colonial story evoking a vision apparent only when the land itself is unseen–at night.

Nineteenth century squatter and amateur ethnographer William Edward Stanbridge reported that the local "Boorong tribe" who knew "more of astronomy than any others" (Stanbridge, 1861: 301) were specialists in studying the night sky reflected in the shallow waters of Lake Tyrrell. The Boorong shared the outlook of most pre-moderns in supposing a correspondence between heaven and earth. The relative location of stars imitated the arrangement of landscape features. Attributes of the night sky were emulated in the stories of their terrestrial correlates. This earth-sky correspondence appears to be conveyed in the lake's name. According to historian John Morieson (Morieson, 1996: 6);

> "The name Tyrrell comes from the local word for "sky" and it is not hard to imagine why. On an occasion when the lake has been replenished, to be there on a cloudless night when the water is still, every star in the firmament can be seen reflected. Standing on a point of land jutting out onto the lake, it is easy to form the impression that one is in space, with the stars all around, above and below. "Tyrelle" had both meanings; "sky" and "space"."

For Paul Carter the *tyrille*[1] of the Boorong is best understood as "primordial space" reminiscent of the *chora* of classical Greek cosmology: "The tyrille was not a clearing but an opening, a cleaving in which all things came into being, doubled like reflections in their proper places" (Carter, 2003: 7).

Today, the heavens remain essentially unchanged and, as Paul Carter says, 'in their proper places' but the lake and its environs, cleared of most native vegetation in the twentieth century, is an ecologically impoverished zone[1]. The heavens are left to mirror the land as it might be remembered, not as it has become. It is a double ('reflected') loss: the absence of an intact ecological surface and the undoing of an imagined pairing or reciprocity of earth with sky.

The Boorong story inspired its use as a metaphor for the global environmental crisis andproduced two questions: First, is it possible to imagine Lake Tyrrell again as an optical aperture or plane? Second, could the regions ecological 'tragedy' (and by association, the world's) be evoked through the lake's poetic 're-pairing' with the heavens in photographs created by starlight on site? Such a re-pairing could infer a *syzygy* of the project title: the yoking together of two or more objects or the alignment of three or more celestial bodies.

2. Project Overview

The *Syzygy* project took place in three phases over four years. First, 'terrestrial' and 'celestial' source negatives were made and found, respectively [see Fig 1]. A year of fieldwork produced the earthly set: photographic shadowgrams on large sheets of low-speed orthochromatic gelatin silver film recording live native invertebrates and reptiles gathered from around Lake Tyrrell and exposed to flash at night on site [see Fig. 2]. The celestial negatives were borrowed astronomical survey photographs on glass plate. The starlight exposures were then executed at a site at the northern tip of the lake most distant from light pollution. The sky-facing shadow films were exposed to ambient starlight under their respective pre-prepared negatives laid after dusk on tarpaulins pegged to the lakebed in daylight [see Fig. 3]. Many shadow-films–a high-speed panchromatic gelatine silver emulsion cut to the same size as the astronomical plates–were exposed simultaneously [see Fig. 4]. To ensure a predominance of starlight, exposures were restricted to a few clear dark, nights each month free of the reflected sunlight of the moon and bright planets. Approximately 270 films were exposed to the stars in 15 events over three years. Finally, the developed films were chemically treated and mounted on glass preparatory to exhibition. A selection of over 100 of these film/glass objects has been configured into some two dozen triptychs and one much larger multi-segment artwork.

A chance conveying of the Boorong story by independent author, artist and scholar Paul Carter inspired the *Syzygy* idea. Later, Paul Carter (assisted by Dr Emily Potter) entered into extensive discussion and writing about the site and project process. The project was also, in part, a response to Paul Carter's *Nearamnew* pavement at Federation Square, Melbourne, a work similarly informed by the Lake Tyrrell story. Physicist and lecturer in Science Education in the Melbourne Graduate School, University of Melbourne Dr Maurizio Toscano was the principal scientific collaborator. He discovered and brokered access to the astronomical survey collection, assisted in plate cataloguing, identification and selection, prepared the long-range starlight exposure timetable, calculated field exposures and helped solve nagging technical

[1] According to Paul Carter (Carter, 2003: 7) "explorer Edward John Eyre named the lake after the Aboriginal word 'derell' meaning above, sky or space", later rendered as 'tyrille' by William Edward Stanbridge.

[1] Victorian state government reports have detailed the environmental 'hazards and conflicts' arising from large-scale land clearing and settlement in the Mallee region, including Lake Tyrrell. For example, only 7 of an original estimated 25 species of small to medium-sized native mammals and marsupials survive in the region. (LCCV, 1974: 153-173 & 219-229, LCCV, 1987: 285-328).

problems. Early in the project Dr Toscano investigated options of fabricating a refraction telescope with the lakebed as the focal plane, turning the lake floor into a radio telescope receiver and concentrating starlight with a parabola of mirrors.

Syzygy was mostly organised on-line and the process visually documented in stills and HD footage edited into a 14-minute documentary movie *Making Syzygy*, posted on-line. ABC Radio National producer and sound artist Christopher Williams made extensive audio recordings produced as the sound track for the movie and a separate 4-part, 44-minute audio artwork. Technician Rudy Frank, local guide Anthony Finch and 20 volunteers participated in the documentation and fieldwork.

The project was enabled by funds provided under Arts Victoria's *Arts Innovation* and the Australia Council for the Arts *Inter-Arts* grant programs.

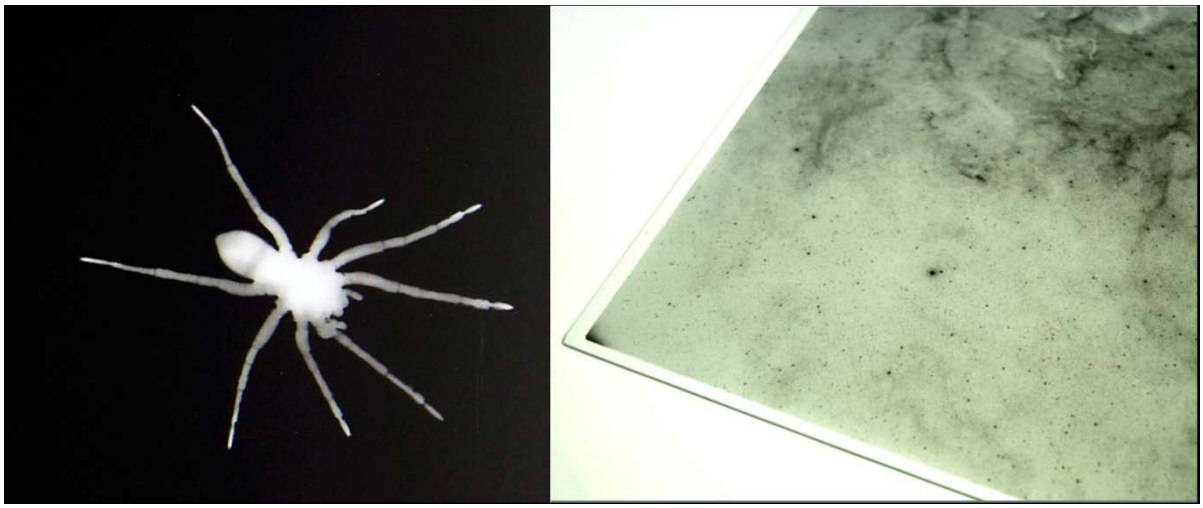


Figure 1. Source negatives. Left: a life-scale 'photogram' of a live Wolf Spider on orthochromatic film created by exposure to flash on site at Lake Tyrrell. Right: the corner of an appropriated '14 inch square' glass plate astronomical survey photograph.

Figure 2. Making the invertebrate negatives. Left: photograms of live invertebrates being exposed by flash at night beside the lake. Photograph by Viren Mohan, 2009. Right: collecting ants in daylight on the lakeshore with a siphon. Photograph by Rudy Frank, 2009.

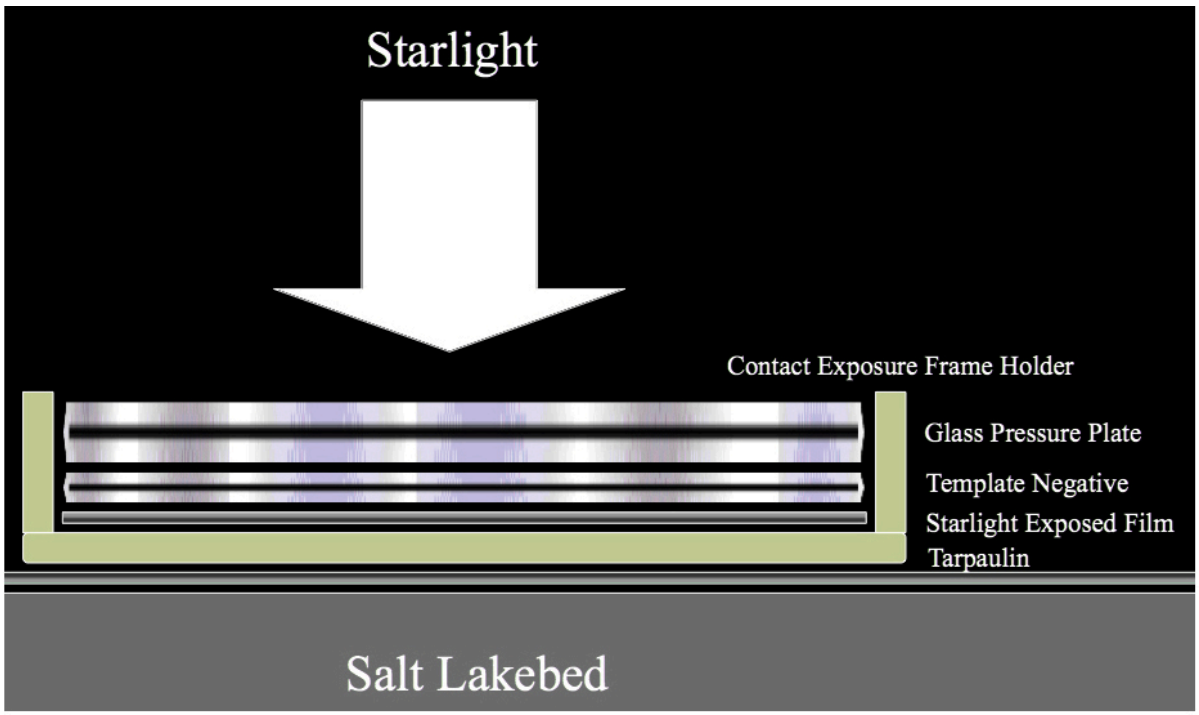


Figure 3. Starlight exposure method. A simple negative/positive contact printing system.

3. The Ecological Gaze

Syzygy is the most recent example of a long-term speculation into the possibility of art manifesting an 'ecological gaze'. This 'ecological gaze' proposes an aesthetic stance attentive to ecological entities, processes and relations framed within a self-reflexive response to the non-human. The first word in this paired neologism, 'ecological' is both a scientific term and phenomenological metaphor whilst the word 'gaze' connotes a psycho-socially conditioned apprehension of the external world as regarded object and incipient subject[2]. The 'ecological gaze' draws on a range of ethical, aesthetic and philosophical critiques of the place of nature in western culture whilst necessarily privileging 'nature endorsing' (empiricist, environmentalist) over 'nature sceptical' (post-modern) positions (Soper, 1995: 4). Although the ecological is presented as metanarrative, its gaze is not epistomologically prescriptive, its singular guiding principle being a poetic engagement with the ecological as 'fact' (phenomena) and 'affect' (feeling)[3].

Prime among facts and affects foregrounded by an ecological gaze is a world undergoing irreversible anthropogenic environmental change. In the popular sense of nature "not human and distinguished from the work of humanity" (Soper, 1995: 15) 'the end of nature' on earth is imminent and the once secure ontological binary 'man/nature' appears increasingly specious. The concomitant decline in environmental alterity and stability threatens to cauterize the ecological identity of place. That these phenomena may be regarded as 'tragedies' is one aspect of the ecological gaze.

Colloquially 'tragedy' describes any serious misfortune, but its stricter application applies to art of that name which in turn probably originated in the ritual sacrifice, 'scapegoat' or *pharmakos*

[2] This construction loosely draws upon Jacques Lacan's psychoanalytic (see Lacan, 1981) modelling and John Berger's cognitive presentations of the gaze (see Berger, 1972).
[3] In a more narrowly analytical usage Claude Raffestin (Crampton & Eldon, 2007:135) appends the term the "ecological gaze" to the process-centred geographical ideas concerning the relationship "between men and spatial morphologies" developed by nineteenth century American proto-environmentalist George Perkins Marsh.

of ancient Greece (Eagleton, 2003: 278-280). The colonial 'sacrifice' of indigenous man and nature at Lake Tyrrell might be understood as tragic in the common and atavistic sense but the auguring of human suffering due to the contemporary elimination of non-human nature across the planet is also tragedy insofar as life imitates art. Here, the twin Aristotelian narrative elements of *anagnorisis* or 'recognition' (eg. realizing the impact of biological destruction) and *peripeteia* or 'reversal of circumstances' (eg. the slippage from ecological security to instability) may well describe the human condition in the face of global environmental crisis.

An ecological gaze attends to the morbid contemporary condition with a sensibility comparable to literary theorist Timothy Morton's "dark ecology" (Morton, 2007: 181) in which the all-inclusive, open-ended, tangled "mesh" of ecological connectivity (and dislocation) is foregrounded. In considering what kind of art *production* might express a dark ecology, Morton argues for a critical *ecomimesis* (evocation of the ecological subject) pursued through an "intersubjectivity" involving an attempted "collapse of aesthetic distance" (Morton, 2007, 164) between world and artist. Summarized as *ambience* such art would inspire "a sense of circumambient or surrounding world…something material and physical, though somewhat intangible, as if space itself had a material aspect…" (Morton, 2007: 33-34).

4. Speculative Research and Critique

To apprehend land by ways and means other than to 'picture' it via habitual ocular tropes is one possible approach to an ecological gaze. A key to uncovering such a way of seeing may lie in photography's distinctive claim to authority, its *indexical* character. This response to an external reality is normally optically mediated so that photography is almost always understood as a mechanical eyewitness. Its indexical authority is located in the appearance of the image outcome, in iconic likeness, in *representation*. The tactile and photochemical *relationship* to the world intrinsic to the act of light capture, the material imprint described by Susan Sontag as "like a footprint or a death mask" (Sontag, 1973: 154) is generally backgrounded. According to Charles Sanders Peirce indexicality is a function of proximity in that it "depends upon association by contiguity, and not upon association by resemblance or upon intellectual operations." (Peirce, 1931-58: 306). To understand the most contiguous and thus most materially indexical of imaging processes–cameraless photography or 'photograms'–Susanne Ramsenthaler argues "one has to distance oneself from the immediate image, making a straight connection with the 'absent part' crucial in its formation. And this is where its power lies." (Ramsenthaler, 2003: 9) It is awareness of what Ramsenthaler calls the 'absent part' conjured by the indexicality of the photogram (more than likeness-making) that lends itself to the production of *ambience*, art made under an ecological gaze.

In considering the representation of ecological tragedy in particular the germane ocular device was considered not to be a morbid iconography revealed by reflected light but an elegiac index of shadows. *Syzygy* staged two species of indexical shadow: preliminary negative photograms made of found living creatures recorded on film under flashlight and the imprints of starlight passing through these and astronomical glass plate photographs onto unexposed emulsion forming the final artworks. Both the photogram negatives and starlit positives imprinted the world under cover of darkness as shadows (shadows made in shadow) implicating an eclectic "dark ecology" of references: Plato's cave, negation, erasure, inside-out "exscriptive writing" (Lippit, 2005: 55), the "atomic-light" body imprints of Hiroshima and Nagasaki and, to paraphrase Milton, 'shadows of heaven'. The intermediate photogram films and their star exposed inversions report anamorphically distorted likenesses of their unseen invertebrate and reptilean referents, translucent overlapping imprints suggesting the interior of things, arguably rendering the technique one of those "phenomenologies of the inside" along with "psychoanalysis, X-rays, and cinema" (Lippitt, 2005: 5).

Gelatin silver proffers peculiar poetic attributes. Silver–to-silver printing harks back to the mainstay of the medium for most of its history, the negative/positive system announced by William Henry Fox Talbot in 1839. Recording the faint nocturnal 'light of the universe' generated extreme 'reciprocity failure' (reduced sensitivity) in the silver emulsion compensated for on-site by exposures extended to almost an hour, an (intentional) optical decoupling symbolic of the narrative of broken reciprocation between earth and sky. To cultural theorist Roland Barthes silver (as distinct from dye-based) photographs are "literally an emanation of the referent" (Barthes, 2000: 81). He muses

> "And if Photography belonged to a world with some residual sensitivity to myth, we should exult over the richness of the symbol: the loved body is immortalized by the mediation of a precious metal, silver (monument and luxury); to which we might add the notion that this metal, like all the metals of Alchemy, is alive."

Live or not, it has long been observed that from the moment (or with *Syzygy,* the hour) of capture a photograph indicates what is past, already or eventually dead, reminding us of the 'ever present passing of time' and our own imminent mortality. Photography is thus unavoidably "a melancholic object" (Prosser, 2005: 1), a *momento mori*, showing "not the presence of the past but the pastness of the present" (Prosser, 2005: 1). *Syzygy* recorded the flashlit shadows of once living creatures and invertebrate and star pictures re-made with congealed starlight. There is pathos intrinsic to these images as in all photographs, but it is a pathos redoubled when we recall that even at the time of exposure the starshine heralded long-gone objects. Even without alchemy, these are images enlivened by fossil light.

Syzygy's mute 'emanations' resist what Walter Benjamin argued to be the usual draining of 'aura'–fetishized preciousness materially connected to origination–in the reproduced or reproducable artwork, especially photographs. The Lake Tyrrell films are 'original' in that they have been produced directly through the 'touch' of their referent creatures, glass plates and cosmic light. Their possible auratic power derives at once from this 'originality' as an index of traces but also from what Deleuze (echoing Barthes) once called the 'fossil' nature of photographs, the physical transformation caused by contact with the light of the referent remaining "even after the latter has decayed" (Marks, 2000: 84). Here, it is valid to be mindful of light's unique touch. Quantum physicists speak of paired photons being 'entangled' with each other across space and time. Many photons congealed in the starlit *Syzygy* emulsions were entangled with partner particles elsewhere in the Milky Way–and beyond. Cosmic aura indeed[4].

Syzygy's artistic associations are eclectic. Although artists like Adam Fuss have photogrammed living creatures in the studio and Susan Derges has recorded outdoor natural phenomena (Cotton, 2004: 206) the live, in situ *plein air* invertebrate captures of *Syzygy* are unprecedented. Many artists have made photograms by moonshine but there is but one known precedent of contact printing by starlight: daguerreotypist Antoine Claudet in 1846[5]. Others privilege the source: in 1894 Swedish playwright August Strindberg exposed photopaper 'celestographs' to raw starlight (Campany, 2005: 115) and since 1998 Erika Blumenfeld has

[4] The unexposed zones of the final films shaded from starlight by overlying negative source imagery are the 'bright' zones of translucency, celestial objects and invertebrate fields.

[5] Batchen, Geoffrey, Professor of Art History at the Graduate Center, City University of New York in a personal email of 22 July 2008 identified a news item of May 1, 1846 in the *Salem Gazette* (Volume 65, Number 35) which quotes the "London correspondent of the Boston Atlas, describing a scientific soiree": "What seems to cause the greatest astonishment, is an impression of black lace upon a daguerreotype plate, by the light of the stars! M. Claudet, in referring to this phenomenon, observed, that he considered it as proof of the chemical power of star-light. He said that he had prepared a plate in the usual manner, covered it with a piece of black lace, and exposed it to the then brightest part of the sky, the constellation Ursa Major, nearly at the zenith. It was left to the influence of these, and the surrounding stars, for about fifteen minutes, which sufficed to impress the black lace upon the plate".

recorded the night without a camera but being unmediated, these images are shadowless. The precisely choreographed *in situ* photogrammetry and *plein air* starlight exposure procedures repeated over three years lent these events the character of faux-scientific ritual or performance, not unlike the site-specific actions of Joseph Beuys. The intimacy between artist, material and site echoed land artists like Richard Long or David Nash who seek the "equivalent…of nature poetry" (Malpas, 1998:38). The invertebrate and reptile imprinting directed by bodily gestures and chance parallel the charcoal frottages of painter John Wolseley, the earth rubbings of Michelle Stuart (Casey, 2005: 59-63) and the serendipitous animal art of Olly and Suzi (Baker, 2002:87).

Syzygy's indexicality (shadow and light) is therefore threefold: one of sense–the bodily and binocular memories of human participants–and two of record: the kinetic 'touch' of creatures and plates imprinting image-holding film surfaces and, pre-eminently, the photochemical *punctum* of ancient cosmic photons energizing silver halides. All three phases of *Syzygy*, the sourcing and making of the negative imagery, *plein air* exposure method and film outcome may be said to reflect on the digital revolution by virtue of the very absence of electronic imagery. In so doing, the project revivifies analogic methods as an arena for speculative research and critique. Clearly, there is an elegant logic to employing photochemical rather than digital techniques in pursuing indexical semiotic strategies: dispensing with the camera, glass optics and the conventions they signify–monocular perspective, the picture frame, focus point, depth of field, 'the view'–enabled a revisionist, 'ambient' rendering of the schema 'landscape'.

The formal resolution of the finished *Syzygy* films, trimmed and face-mounted on starfire glass panes bordered by a circular black mask screen-printed on the opposing side, silently infer the glass astronomical survey archive, magnification optics and zodiacal wheel [see Fig. 5]. In an otherwise degraded landscape, the invertebrates (and some reptiles) gathered around Lake Tyrrell offered a bounteous and evocative iconography of locality, fragility, otherness, sociability, competition, threat and mortality [see Figs. 6, 7]. Seen in reproduction at life-scale, these creatures present a potent terrestrial analogy with the specks, streaks, wafts and explosions of the night sky, analogy returned in the otherwise faint and unseen contents of the heavens massively enlarged for clarity by telescope [see Figs. 8, 9]. Alone and counterposed, the two sets of masked photographs draw our gaze to the heart of the ecological idea: our inescapable embedment within the planetary evolutionary knot, interdependent biosphere and unimaginably vast and old universe.

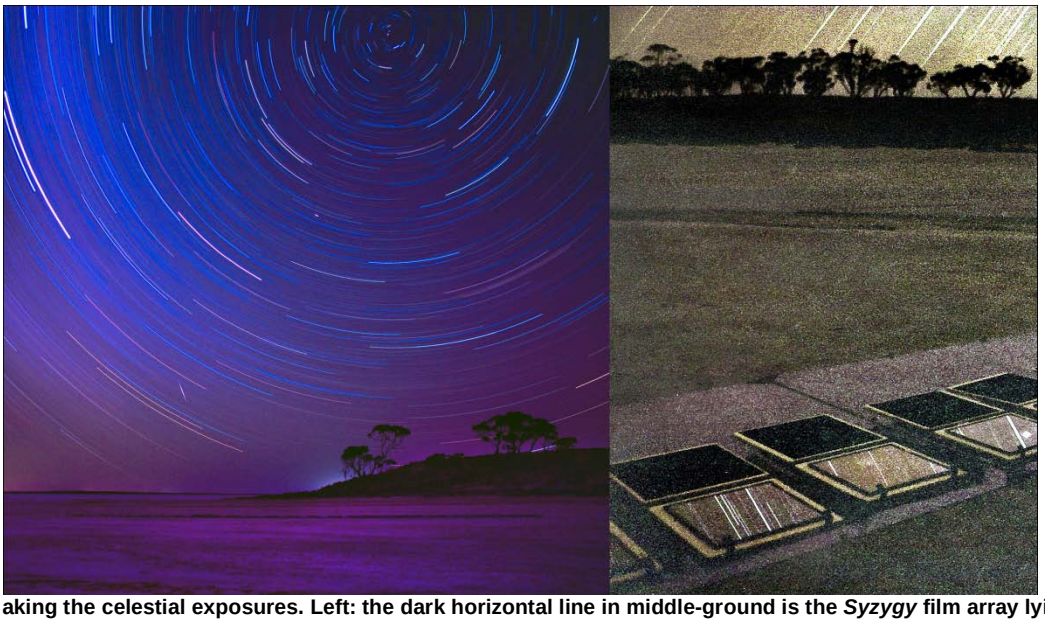


Figure 4. Making the celestial exposures. Left: the dark horizontal line in middle-ground is the *Syzygy* film array lying on the dry bed of Lake Tyrrell during their 56-minute exposure to ambient starlight. Photograph by Glenn Wilson, 2008. Right: star-trail reflections on the films during their nocturnal exposure on the lakebed. Photograph by Viren Mohan, 2009.

5. Remediation

The celestial images of *Syzygy* remediate some 120 astronomical “14 inch” (367 mm) square glass plate photographic negatives borrowed from what was at the time the collection of Dr Rachel Webster, Professor of Physics, University of Melbourne. The selections were drawn from a northern hemisphere (‘NGS-POSS 1’) series made by the Mount Palomar Schmidt telescope, California between 1948 and 1958 and a set of southern sky (‘UKST’) pictures recorded by the Anglo-Australian Schmidt instrument at Siding Springs, NSW between 1973 and 2002. Each plate covers a little over 6 degrees of arc (equivalent to a dozen full moons) with a resolving power about a million times that of the unaided human eye. The 3000-odd plates comprise part of the world’s first systematic survey of the entire visible universe.

Syzygy’s remediation has a sole antecedent in Thomas Ruff’s 1989-92 *Sterne* (Star) series in which Chilean La Silla observatory (‘ESO’) plates made between 1974 and 1987 were enlarged using traditional darkroom techniques. What critic Hennig Engelke observed about Ruff’s work is equally pertinent here: these re-presentations of data as art unavoidably allude to the “elusive synthesis” described by Alfred Tauber (Engelke, 2005: 13) dividing aesthetics and empiricism and the schism between CP Snow’s “two cultures” of science and the humanities (Engelke, 2005: 1). Unlike its German precedent however the ambiguity of authorship inherent in the act of remediation in *Syzygy* is less linked to Marcel Duchamp’s “readymades” and modernism’s attack on the fetish of authenticity than to older habits of artistic appropriation and simulacra.

Digital sensing has long superceded analogic astronomical photography but scans of all three plate series’ undertaken by the Royal Observatory, Edinburgh and available on-line are the foundation for *Google Sky* and the prevailing data-base for contemporary professional astronomy. Though scientifically redundant the original plates remain archetypal scientific documents emblematic of empirical method, the Enlightenment and modernity: they remind us that magnification optics and scientific photography have been essential to the emergence and continual refinement of the post-Copernican world-view. Whilst *Sterne’s* uncompromised reprintings could be seen simply as “photographs about photography” (Engelke, 2005: 4) *Syzygy*’s radical recontextualization militates against such glib readings. Both projects’ illustrate that transforming scientific data into art through remediation might be the only way such evidence from another age retains or regains cultural relevance.

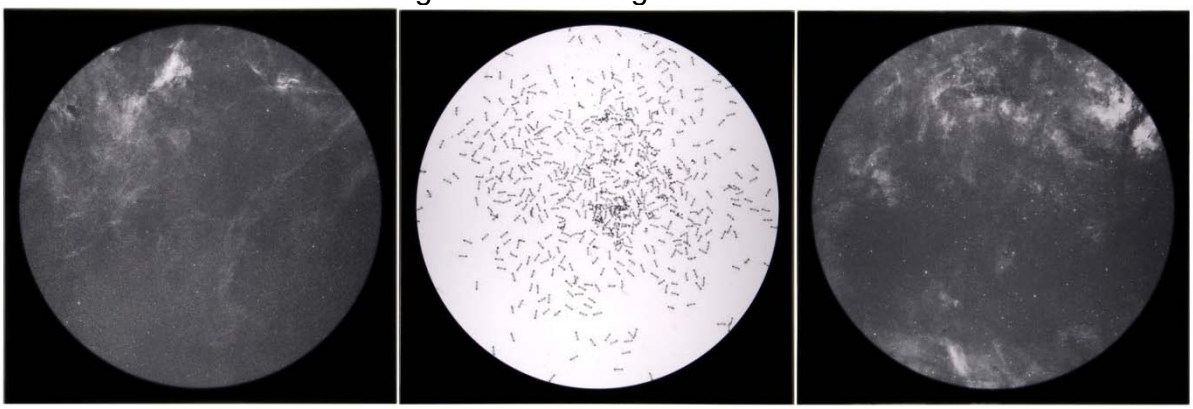


Figure 5. *Syzygy 5/The Cygnus B Triptych*, 2010. Toned gelatin silver films mounted on starfire glass with screen-printed masks slotted into hardwood support. Three glass/film objects 337 x 357 x 5mm on base 30 x 80 x 1100mm.

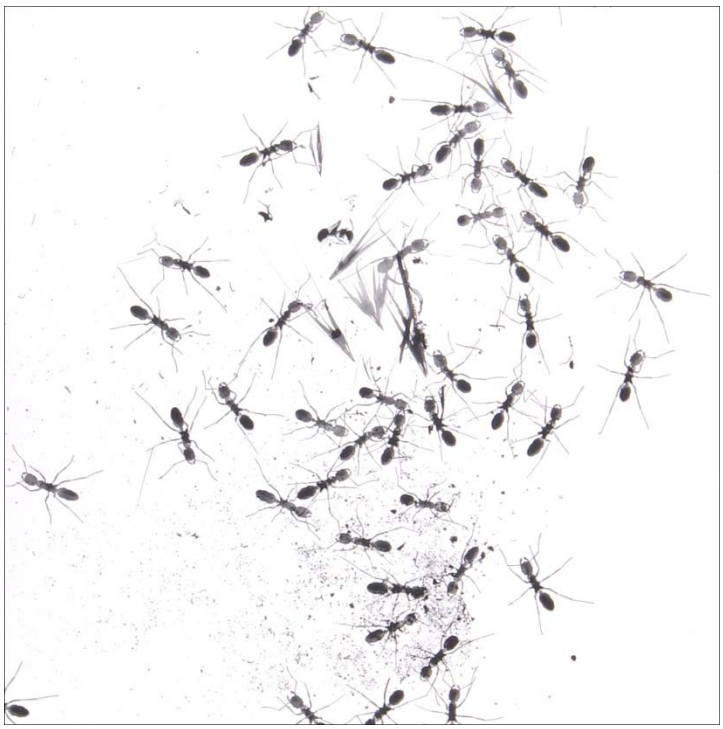


Figure 6. *Syzygy 8/The Carina Volans Triptych*, 2010. DETAIL. Swarming ants and associated nest detritus are generic icons that also specifically reference Mallee ecology.

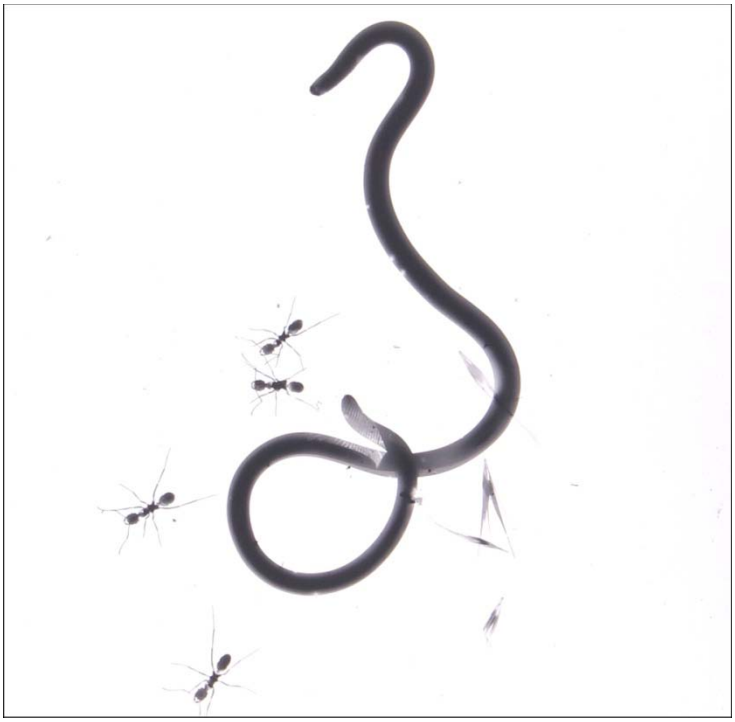


Figure 7. *Syzygy 4/The Pointers Triptych*, 2010. DETAIL. Chance and probability are integral to the conceptualization of an 'ecological gaze'. This creature, identified as a rare Mallee Worm Lizard *Aprasia aurata* meandered into the project site at Lake Tyrrell one night whereupon it was gently captured, photogrammed and released.

Figure 8. *Syzygy 6/The Fornax Triptych*, 2010. DETAIL. The exquisite detail and tonal subtlety of the original gelatin silver astronomical imagery on glass plate is reproduced without visible loss in the emulsion-to-emulsion contact printed *Syzygy* positives.

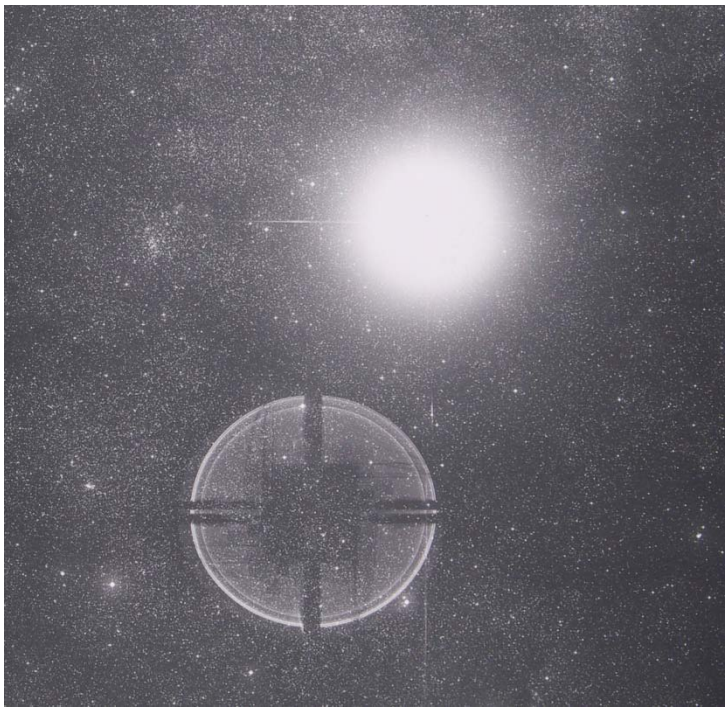


Figure 9. *Syzygy 4/The Pointers Triptych*, 2010. DETAIL. The circular form broken by cross bars is an optical artifact called a “ghost” projected onto the original photographic glass plate from inside the telescope by the refracted light of the adjacent bright star in the Crux or Southern Cross group. Such imaging ‘imperfections’ have been removed from the scanned digital archive and are usually excluded in publications but are reproduced without interference in the *Syzygy* films in deference to their indexical authority and scientific pedigree.

6. Transdisciplinary Context

Syzygy was transdisiplinary in intent and outcome. Post-colonial scholar Paul Carter's retelling of the Boorong story was its poetic *raison d'être* and astrophysicist Maurizio Toscano's accessing of the plates and scientific insights enabled and abetted progress at all stages. The impact on the participants similarly crossed fields. For both Paul Carter and Maurizio Toscano the project involved grappling with analog photographic techniques and poetics. For the artist, undertaking *Syzygy* necessitated knowledge of the ecological and indigenous history of the Mallee, descriptive astronomy, astrophotography history and techniques.

Syzygy's agenda was art but art made 'in the shadow' of the emerging uber-zeitgeist, global environmental crisis. If by 'political' we include the power relations determining and determined by belief and emotion, the raw material of art, *Syzygy* addresses environmental politics in three ways: pedagogical, indigenous and relational. For Dr Toscano, *Syzygy* presented an opportunity to examine philosophical analogies between art and science and to uncover strategies through which art can be "a vehicle for introducing students to the indigenous, aesthetic, cultural and ecological conceptualisations of science"[6]. In respect to indigenous concerns *Syzygy*'s focus on landscape tragedy seen through a relic of lore from a destroyed people silently implicates the human tragedy of colonial dispossession. Far from being an act of xenotentrism, the appropriated Boorong story confers mythopoetic voice to country about which the colonizing culture is largely silent: to Paul Carter this "meditation on the heavens" is an example of how the "recovery of stories, alternative histories, and their creative retelling, is a vital means through which artists…can contribute to the re-enchantment of environments currently under stress"[7].

7. Conclusion

By revivifying analogic methods as an arena for speculative research and critique, transforming appropriated scientific data into affectual imagery through remediation and reframing environmental art as politics in a transdisciplinary context, *Syzygy* was and is an unequivocally poetic act inviting further dialogic and artistic response.

[6] Toscano, Maurizio, personal communication and official letter of support submitted to Arts Victoria, dated July 27, 2006
[7] Carter, Paul, personal communication and official letter of support submitted to Arts Victoria, dated July 24, 2006

References

Baker, Steve, 'What does becoming animal look like?' in Rothfels, Nigel, *Representing Animals,* Indiana University Press, 2002

Barthes, Roland, *Camera Lucida: Reflections on Photography*, translated by Richard Howard. Hill & Wang, New York, 1981

Berger, John, *Ways of Seeing*, BBC, 1972

Campany, David, *August Strindberg, painter, photographer, writer,* Tate, 2005

Carter. P H. 'Sustaining Places: Lake Tyrrell at Federation Square' in *Mildura Palimpsest #5*, Mildura Palimpsest, Mildura, 2003 @ **www.artsmildura.com.au/old_sites/palimpsest/pdfs/Palimpsest%205.pdf**

Casey, Edward, S, Earth-Mapping: Artists Reshaping Landscape*, University of Minnesota Press, 2005*

Cotton, Charlotte, *The Photograph as Contemporary Art*, Thames & Hudson, London, 2004

Eagleton, Terry. *Sweet Violence: The Idea of the Tragic*. Blackwell Publishers, Oxford, 2003

Engelke, Hennig, *Thomas Ruffs "Sterne" Konstellationen zwischen Kunst und Wissenschaft,* Deubner-Preis, 2005 @ www.deubner-preis.info/engelke.pdf

Lacan, Jacques, *The Four Fundamental Concepts of Psychoanalysis*, Norton, New York, 1981

Land Conservation Council of Victoria, *Report on the Mallee Area*, LCCV, Melbourne, 1974

Land Conservation Council of Victoria, *Report on the Mallee Area Review*, LCCV, Melbourne, 1987

Lippit, Akira Mizuta, *Atomic Light (Shadow Optics)*, University of Minnesota Press, 2005

Malpas, William, *The Art of Andy Goldsorthy: Complete Works*, Crescent Moon, 2005

Marks, Laura, *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses*, Duke University Press, 1999

Morieson, John, *The Night Sky of the Boorong: Partial Reconstruction of a Disappeared Culture in North-West Victoria*, MA thesis, Australian Centre, Faculty of Arts, University of Melbourne, December 1996 @ http://adsabs.harvard.edu/abs/1996MsT.....5M

Morton, Timothy, *Ecology Without Nature: Rethinking Environmental Aesthetics*, Harvard University Press, 2007

Peirce, Charles Sanders, The *Collected Papers of Charles Sanders Peirce*, edited by C. Hartshorne & P Weiss, Harvard University Press, Volume 2, quoted in Chandler, Daniel, *Semiotics: The Basics*, Routledge, 2002, p 42

Prosser, Jay, *Light in the Dark Room: photography and loss*, University of Minnesota Press, 2005

Sontag, Susan, *On Photography*, Penguin Books, 1973

Soper, Kate, *What is Nature?,* Blackwell, 1995

Raffestin, Claude (translated by Gerald Moore), 'Could Foucault have Revolutionized Geography?' in Crampton, Jeremy W & Stuart, Elden, *Space, Knowledge and Power: Foucault and Geography*, Ashgate, 2007

Ramsenthaler, Susanne, *Playing at Distance: Photographic Perception and Close Contact,* 'Visual Knowledges Conference' paper, The University of Edinburgh 17-20 September 2003 @ www.susanneramsenthaler.com

Stanbridge, William, *On the astronomy and mythology of the Aborigines of Victoria*, Transactions of the Philosophical Institute of Victoria, Volume 2, 1857

Stern, Steven, 'After Nature', *Frieze* magazine, Issue 119, Nov-Dec 2008

New Imaging: Transdisciplinary Strategies For Art Beyond The New Media

Gavin Perin University of Technology Sydney
Linda Matthews University of Technology Sydney

Abstract
If the eighteenth century Picturesque can be regarded as a proprietorial strategy for mediating the visual experience of landscape, then the proliferation and configuration of webcam networks to promote iconic city form can be seen as its contemporary counterpart. These digital systems, in their most voyeuristic and passive form as a new privileged vantage point for the 'remote' tourist to view the city, allow civic authorities to curate the visual experience of the contemporary urban landscape.

Unlike the formal stability of the Picturesque view, the webcam's digital conversion of the real provides viewers with the opportunity to adapt and mediate their experience. Importantly, this digital conversion is able to offer the designer new ways to materialize three-dimensional form. This adaptive facility of webcam content paradoxically subverts the surveillant and the promotional uses of these systems and converts it into qualitative and experiential material.

The paper will discuss how open-source digital software can be recruited to process and interpret virtual qualitative data from webcams to the point where it can generate a formal response to civic space. This digital manipulation of the two-dimensional webcam view, asks the designer to relinquish the images commonly used to substantiate urban form and to respond to duplicate virtual and real-time sites whose coexistence shifts the temporal framework traditionally used to guide formal intervention.

The application of this unprecedented technique reveals an opportunity to reinterpret the paradigm both for our experience of 'virtual' and urban space and for material intervention within it.

Introduction
The use of webcam systems as a promotional tool targeted at the remote tourist has conceptually converted the surveillant function of CCTV systems into the service of the spectacular. This conversion can said to be picturesque both in motivation and experience: not only are these spaces constructed to facilitate tourism but their actual distribution instigates a mode of spatial navigation that can be understood as a virtual counterpart to the physical experience of wandering through the landscape wherein the viewer gradually orientates and forms an image of the whole.

W.J.T. Mitchell writes that "landscape is already artifice in the moment of its beholding, long before it becomes the subject of pictorial representation' (1994). This is because "before all these secondary representations… landscape is itself a physical and multisensory medium… in which cultural meanings and values are encoded, whether they are put there…or found in a place formed" (Mitchell, 1994). Thus if all representations of landscapes intrinsically embed social or cultural values any experience of the real is already mediated and in a sense contaminated by a projected meaning. The techniques of the picturesque can therefore be said to initiate a figurative movement that attempts a semiotic conversion of the real into a universal signifier.

The comparison, in this paper, of webcam systems to the traditional picturesque is, therefore, premised on the belief that the imagistic promotion of urban landscape through webcam technologies is both representational and an 'inhabitable' space that is made comprehensible through temporal spatial negotiation. Furthermore, as in the traditional picturesque, the figurative capacity of these webcam systems, being intimately linked to

the medium of construction and transmission of the image, finds its modern counterpart to be equally susceptible to the exertion of spatial control through the imposition of the aesthetic choices of authoritarian bodies. In these ways the webcam not only duplicate picturesque strategies but also actually extends and diversifies its capacity to mediate and signify experience.

Circular Quay Project

Linda Matthews' 2007 project investigated how urban interventions could be developed through the collection and translation of data sets through a range of digital tools. The emphasis was to quantify the qualitative, and in this respect Matthews developed a methodology whereby non-proprietary medical imaging software named 'ImageJ' was adapted to extract and assimilate the qualitative colour rendering properties of images gathered from different webcam views. Tests of webcam sites in London, Paris and New York revealed different tonal profiles it was decided to see if it could offer an alternative logic to urban form-making. (Figure 1) After investigating a range of sites Sydney's Circular Quay precinct was selected because of the strict planning regulations that aim to protect the visual integrity of the Sydney Opera House. The hope was to see if this process could generate both a programmatic and formal response that challenged this aesthetic regulatory framework.

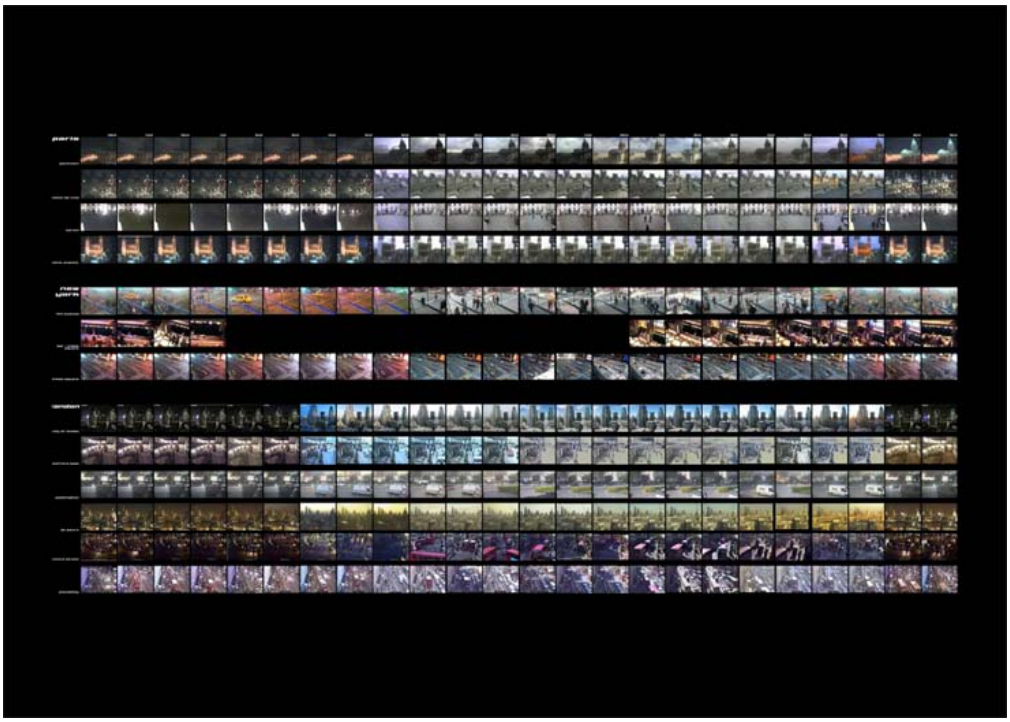


Figure 1: Captured webcam images of Paris, New York and London

To this end the software 'ImageJ' was employed to test how a formal intervention could disrupt the site's existing colour profile. The software revealed Circular Quay's colour profile had a bias to the tertiary purple to blue tonal range. (Figure 2) Given these colours are traditionally associated with passivity and possess a receding or low visibility it was decided to find a formal and material mechanism by which to increase visibility, particularly at night when most virtual tourists would visit the webcam site. For this reason any new intervention deliberately exploited the optical properties of colours in the more visibly dominant purple to blue tonal range

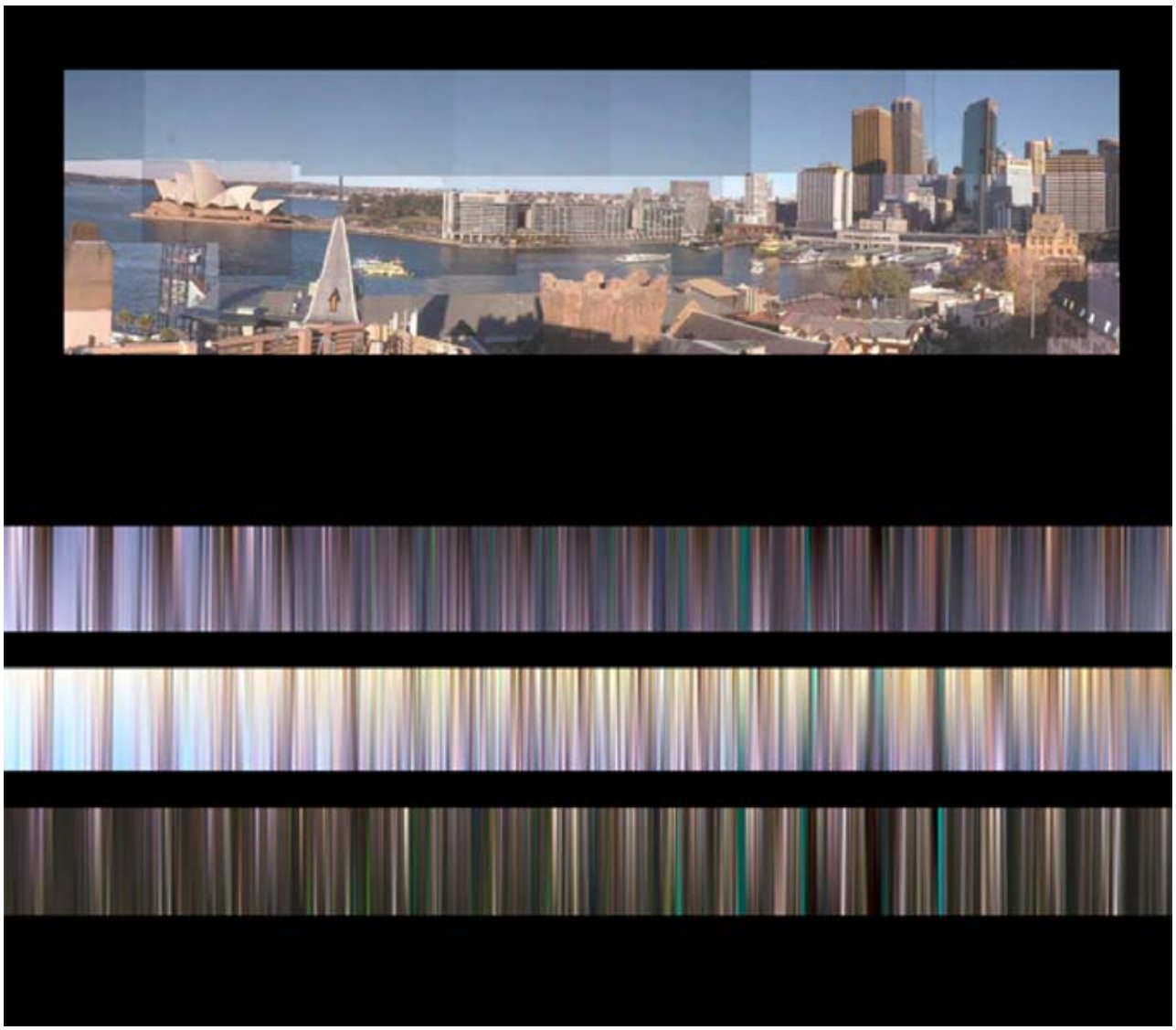


Figure 2: Composite webcam image of Circular and 'Imagej' colour rending profile of that image

Given this desire to disrupt the existing colour profile, and that the webcam digital interface employs an additive RGB colour system, it was decided that any built intervention should employ primary blues and complementary yellows. This was based on the knowledge that not only are these the most visible and luminous colours of the spectrum but also that any combination of these complementary secondary colour produces white. As the 'ImageJ' colour profile in figure 3 demonstates such an intervention increases the overall brightness. This exploitation of the RGB system produced a condition of maximum brightness at the site's prime viewing time. Furthermore, this visual difference was later used to determine programmatic type and distribution, with the the highly visible yellow zones assigned the dominant primary programs and the blue zones, secondary, less active, functions.

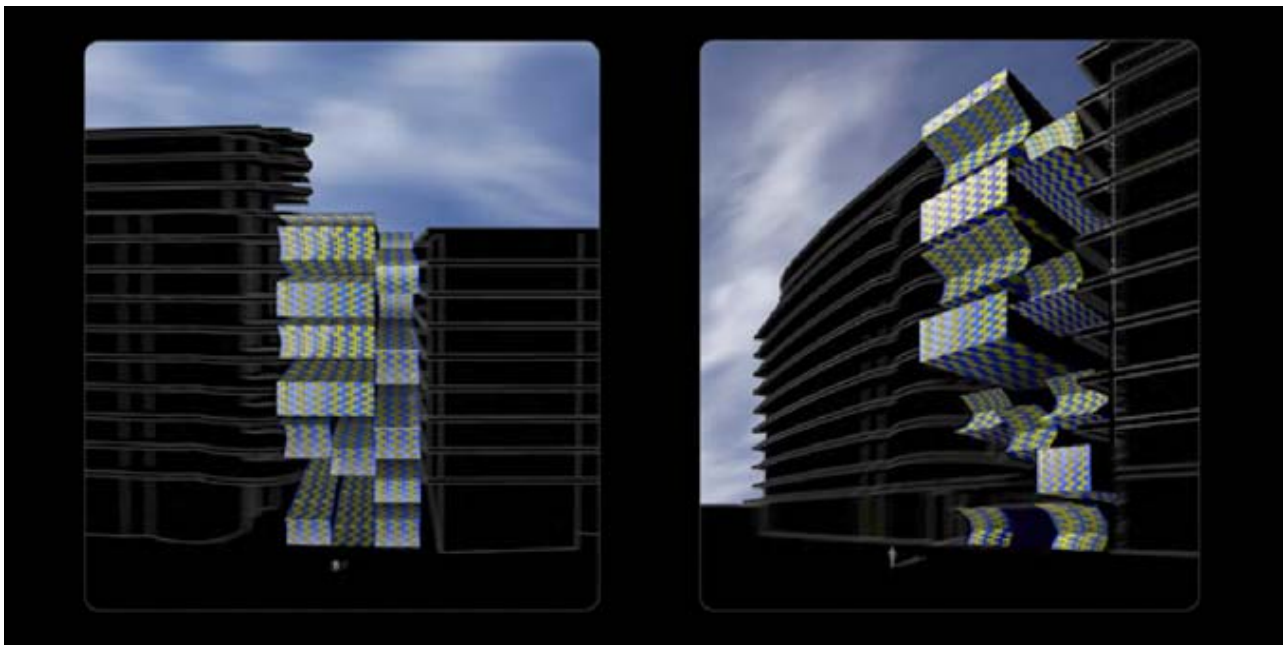


Figure 3: Left image webcam view of experimental theatre at #1 East Circular Quay and right image street view of the same building

The Political Dimension of the Image

Unlike conventional physical or virtual translations of picturesque principles the Circular Quay intervention involves the use of technologies and techniques that contest those authorising processes behind the construction of such images. This disruptive act subtly contaminates the attempt by regulatory authorities to curate images of the city, which are of course underscored by highly determined and politically sanctioned power structures that have always governed the image of the city. This thinking is supported by Louis Marin's study of the narrative and descriptive structures of three different seventeenth city 'portraits', in his book *Utopics: Spatial Play*. In discussing the maps and their associated 'supplementary images' of city life Marin makes the following three statements:

1. The city map represents the production of discourse about the city.

2. The deconstruction of this representation uncovers the ideology controlling it.

3. The city map is a "utopic' insofar as it reveals a plurality of places whose incongruity lets us examine the critical space of ideology." (Marin, 1984).

Thus, for Marin, the political dynamics of the monarchy serve as an example whereby power functions around the production of the city portrait and the figurative structures illustrated in the interplay between the main city view and the supplementary images. The exercise of political control, gained through the 'right' to image spaces, is, therefore, inexorably linked to the power structures governing the creation and propagation of images.

Of course, the political import of these maps is facilitated by virtue of the prohibitive expense of manufacture as it did for the need to furnish images of the city that catered to the sovereign's expectations. To find a more contemporary democratic example one must turn to W.J.T Mitchell's analysis of picturesque landscapes in the essay *Imperial Landscapes*. (1994) The import point being that democratic power structures necessitate imagistic tactics that appeal to a much broader audience rather than a single select

sovereign. Extending this argument it is safe to say that the accessibility of webcam systems is yet another vehicle by which to democratisation the city view. However, caution must be exercised here because accessibility is not the same as possessing agency in the creation of that image; one might well occupy that space but is no way empowered to curate or alter the view. If, as both Marin and Mitchell note, the representational agency of such images are tied to the politics behind their creation together with the current technologies of production then the desire to impart figurative meaning to the physical effectively collapses the differentiation between these two aspects so that the image directly mediates and informs the configuration of the real. Like Marin, Mitchell's '*Imperial Landscapes'*, also reminds us that the decision to frame the landscape from a specific viewpoint, together with the representation techniques and media, inevitably exposes the author's bias. Within this context, the conventions of the representational system can be corrupted to alter the figurative trajectory of the normative that to be effective must inspire acquiescence of people to willingly incorporate these images as their own.

Signification and Affect and the Affect of the Sublime

Over the last two decades the gradual erosion of the symbolic functioning of images and objects in the discipline of Architecture has seen the rise of two other paradigms, based either on performance or affect. In the case of the former, architectural form has effectively become understood as a prosthetic device that functions to satisfy specific performative criteria and their privileged data sets. In the latter, form is framed within arguments of the experiential. As such Architecture, functioning either as a narrow performative scientific paradigm or as an affective object, has effectively fallen back into the two dominant paradigms of modernism where form either privileges performative functioning over its status as an encultured artefact, or is qualitative, which as in the case with Clement Greenberg, allows the politics of taste to resurface.

In the essay *'A Picturesque Stroll Around Clara Clara'*, Yve Alain Bois's discussion of Richard Serra's sculptures reminds us that there are two different picturesque traditions and both relate to figural comprehension. The beautiful conforms to the more normative understanding of the picturesque as where the organisational logic of an object or space becomes revealed and thus knowable. (Bois, 1986) In the second, the sublime, any sense of order is refused and there is no immediate capacity for intelligible formal understanding because the object lacks a discernable gestalt. It remains outside the capacity to link form with either a figurative trajectory or a knowable experiential quality. (Bois, 1986) The second point is important because the lack of form ensures its figure remains outside predictable phenomenological experience. Importantly to this discussion is Bois's implicitly assumption that the functioning of the sublime is provisional upon this figural comprehension rather than upon scale. The significance being that any object can be aligned to the sublime picturesque.

Bois's identification of the issue of figural comprehension is thus doubly significant: in the first case it allows the object to fall into a semiotic condition; it is asked to "stand in for" or represent something else. In the second, one's capacity to know is linked to the ability to simply make sense of its form. The "beautiful" picturesque tradition functions to contain and stabilise the object through establishing a defined viewpoint and frame. This stabilising of the image is crucial because it is the very mechanism by which the author can facilitate a semiotic reading of the object's figure. This point is crucial because it effectively establishes the continuance of a particular type of intellectual tradition that dates back from late as post modernism and at least as far back as the eighteenth century picturesque, irrespective of whether the object was presented within phenomenological or linguistic tradition. (Taylor, 1992).

Bois's exposure of the sublime as a condition of figural indeterminacy, rather than object scale, provides a way in which to better understand the affective potential of the use of optically unstable patterns in Matthew's Circular Quay project. The type of sublime affect Bois raises is one where the figure of form is experientially incomprehensible, hence the increased luminosity caused by altering the colour rendering of the Circular Quay site requires further tactics to produce a formal instability that becomes experientially beyond categorisation and also duplication. On one level this indeterminacy is produced by use of the Munsterberg pattern as a metric by which to scale the façade. (Figure 4) On another level the project also exploits the logics underpinning digital pixel systems. Thus the scaling of each façade component, to match variations within the camera's depth of field, produces a virtual view of the façade that constantly shifts in and out of focus as the camera is manipulated. This blurring was exacerbated by the proposal to construct the façade out of a panelling system where alternating solid black and transparent white sections cause the light to bleed around every joint.

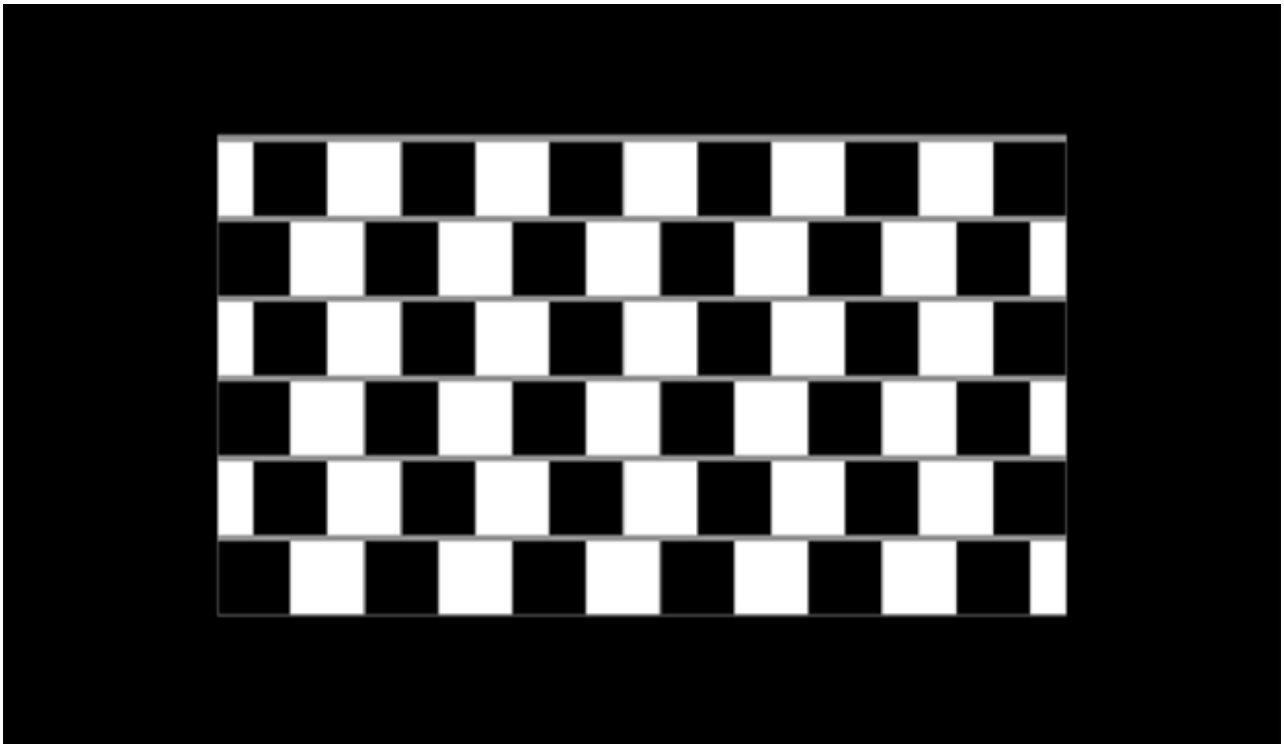


Figure 4- The Münsterberg Pattern

These formal manoeuvres produce a variation in density patterning, which when distributed across vertical and horizontal webcam's picture plane, works to create an experiential disjunction between the webcam and real space of the Circular Quay precinct. The desire to impart spatial depth to the façade further enhances the digital disruption caused by the anamorphic projection of the Münsterberg pattern, ensuring that the experience of 'real' site is disjunctive to what one sees from the webcam. (Figure 5) Cumulatively these design acts subvert the desire of authorities to control and co-opt these city views into a figurative, and therefore, ideological construct. Unlike the beautiful, which has the potential to fall into the linguistic through referential play, the form here is closer to attaining a condition of the sublime because, being beyond comprehension, it is inevitably posited in the realm of indeterminate affect. This notion of affect is fundamentally different from the functioning of the figure in modernist phenomenological aesthetics because, being a product of the figured object, it can exist without resorting to semiotic abstractions. This avoids the fate of modern and post-modern phenomenology, where the abstract is converted into a new semiotic structure. Consequently, what Bois offers is a conception of

phenomenology that by incorporating the object's figure allows it to always sit outside any conceptual framing and therefore the politics of taste.

This condition is, of course, a very different functioning of the figure to that which Mitchell discusses in Augustus Earle's 1827 painting Distant View of the Bay of Islands, New Zealand. Mitchell is careful to point out that Earle subverts picturesque conventions to rupture the normative narrative associated with these types of images and makes particular note of Earle's subversive use of the Maori totem disrupts the traditional function of the picturesque side-screen 'lead-in' figure. Mitchell notes that:

> "It does not… provide a dark refuge for the viewer to hide behind, nor does it provide a convenient stand-in for the beholder's gaze within the composition. On the contrary, it is a hazard, an emblem of an alien vision that stares back into the space of the beholder… The carved figure…alludes to the traces and vestiges of the picturesque side-screen; the figure may "stand in the place of"… but it does so only to show that convention displaced by something else." (Mitchell, 1994)

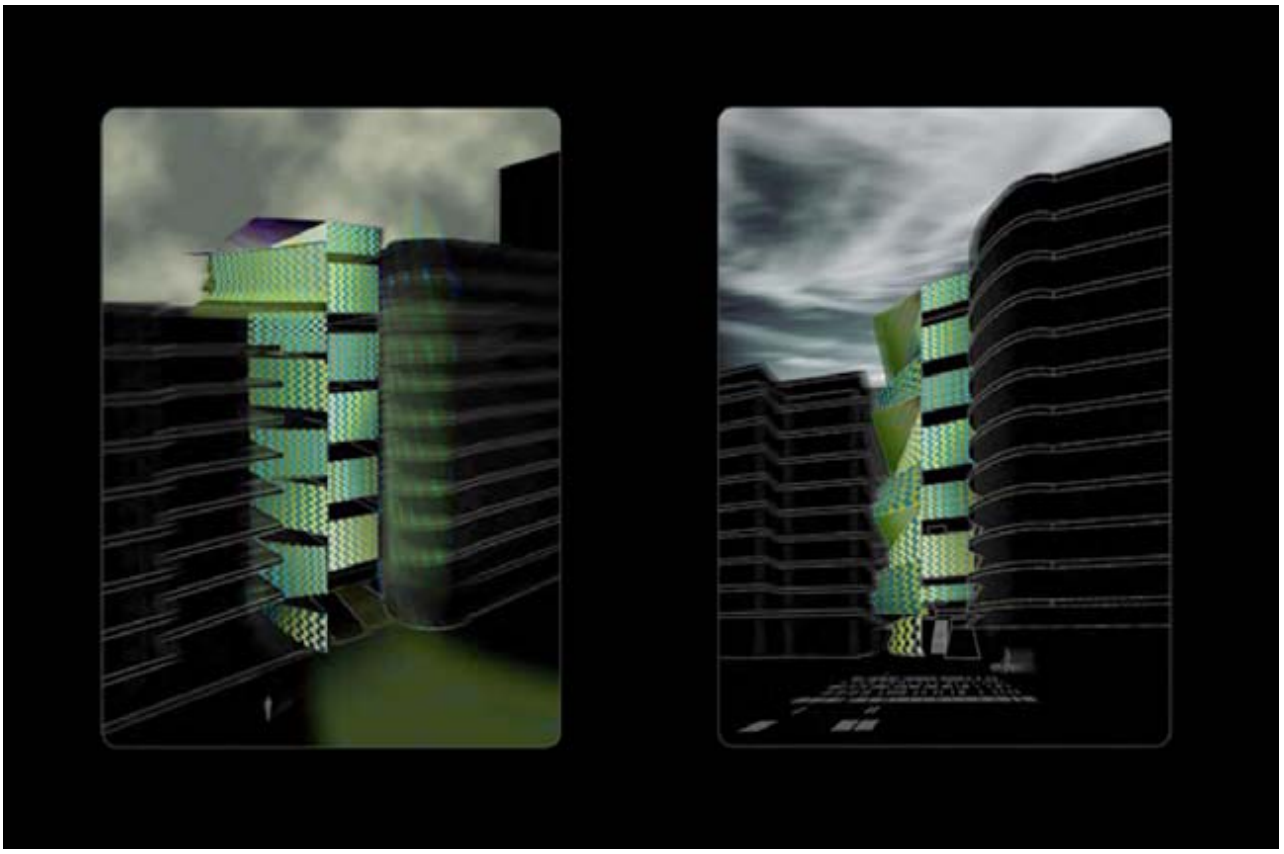


Figure 5- Left image is the webcam view of karaoke club at #7 East Circular Quay and the right image is the street view of the same building

For Mitchell this contestation is about the conventions of the representation; as he adds this "something else" is neither the landscape or nature "but another convention for organizing and perceiving the landscape, one that contends with and reshapes the convention that Earle carries as picturesque traveller. (Mitchell, 1994) The point Mitchell makes here is that the Maori carved figure is not only a figure that contests the conventions of the European picturesque but also one that demonstrates that the picturesque notion of surveying and viewing the landscape is not a distinctly western understanding of the same. The figure's view may be oriented differently to that of the western gaze but it still "indicates at a minimum that "stopping still just to look" at the land

is so important to the Maoris that they erect a statue to keep surveillance over a place." (Mitchell, 1994)

The collective disruptive effect of all these tactics on the webcam's picture plane in Matthew's Circular Quay project therefore acts in a similar way to Earle's carved figure. The point of difference being that these interventions do not lie within the narrative conventions of the image but instead disrupt the experience of viewing on site, both as a real time, physical, and 'virtual', visual experience. The project's agency does not rely on Earle's figurative disruption of meaning and signification but rather on the inability of the interventions to imagistically stabilise and form. As with Bois's reading of Serra's sculptures, the figure of this intervention acts as a sort of deceptive formal index that fails to deliver the experience we expect on first sighting.

In the co-authored essay, *'Montage and Architecture'*, Bois's discussion of Sergi Eisenstein's cinematic procedure to achieve visual instability is instructive in better understanding the import of the deliberate production of disjunctive "affect" of the webcam. Eisenstein, who attributes this notion to Piranesi's deliberately disjunctive visual technique, explains this affect in the following way:

> "(But while) the eye expects to see behind the arch the continuation of the architectural theme preceding the arch normally reduced by perspective, (it is, in fact) another architectural motif that appears behind the arch, and moreover, in a reduction of perspective almost double what the eye had supposed. ... Hence an unexpected qualitative leap from the space and the grand scale. (Bois & Glenny, 1989)"

Piranesi obviously constructs this effect by exploiting the inertia of the eye to continue a movement once it has been directed. The collision of this "suggested" path of movement with another scopic path produces a jolt, and as Bois remarks on Eisenstein's work "this analogous ability of retaining imprints of a visual impression (are)… the phenomenon… (on which) cinematic movement is built.' (Bois & Glenny, 1989) In this light the failure of the virtual tourist to focus the webcam image turns the passive consumption of the iconic view into a type of experience that is initiated by the camera's path.

While the Circular Quay project stops at the façade there is no doubt that such visual strategies can utilise the scopic regime of CCTV systems to affect interior real and virtual experience. However what Matthew's Circular Quay Project indicates is that the deliberate shifting nature of the image produces an experience of and engagement with the view that constantly defies stabilisation and therefore creates a disjunctive moment between image and experience that sits outside comprehension. The operation of the sublime picturesque within this contemporary context means that its function is duplicated by its performance within both virtual and the real contexts and inasmuch it stands outside any quantifiable or stable frame. Consequently there is neither a moment whereby the figure can ever be completely understood semiotically or experientially. This tactics not only act to deliberately challenge the governmental by-laws but also challenge the promotional agency of the webcam system itself. The use of the figure and form shifts the issue of representation from portrayal to affect but does so in a way that operatively undoes the viewer's capacity to simultaneously read architectural materiality or the figure's form. By disrupting the regulatory control of these images it also opens a space for productive engagement with the making of these city images that refuses to privilege sanctioned forms or render stable and unproblematic postcard images of the urban landscape.

References

Bois, Y, & Glenny, M., “Montage and Architecture: Sergei M. Eisenstein”, Assemblage, No. 10 Dec., 1989, pp. 110-131.

Bois, Y, “A Picturesque Stroll Around Clara Clara”, in Michelson, A, Krauss, R, Crimp, D, Copjec, J (eds.), ‘October: The First Decade’, MIT Press Cambridge Mass. & London, pp. 342-372.

Marin, L., “Utopics: Spatial Play”, London: Macmillan, 1984.

Mitchell, W.J.T., ‘Imperial Landscapes’, in Mitchell, W.J.T (ed.), “Landscape and Power”, University of Chicago Press Chicago, 1994, pp. 5-34.

Taylor, M.C, ‘Disfiguring : Art, Architecture, Religion’, University of Chicago Press, Chicago, 1992

The Transdisciplinary Potential of Remediated Painting

Anne Ring Petersen University of Copenhagen

The thematic frame of the conference challenges its speakers to reflect critically on the concept of mediation and, at best, discard it altogether because it has become "increasing normative and doctrinaire" (cf. the CFP). … This is a tough nut to crack: To think about visual representations without a concept of mediation is like trying to think about the subject without a concept of identity. Both concepts are disputed, but without them certain key questions cannot be thought at all. One way out of this theoretical conundrum is to subject the concept of mediation to a deconstructive critique. Unlike those forms of critique which aim to replace inadequate concepts with 'truer' ones, the deconstructive approach puts key concepts 'under erasure' to indicate that they are no longer adequate in their originary and unreconstructed form. As there are no other, entirely different concepts by which to supplant them, one has to continue to think with them in a deconstructed form that no longer operates within the paradigm in which they originated (Hall 1996: 1-2). Thus, in a deconstructive perspective, the solution is not to discard the concept of 'mediation' together with the related concepts of 'medium' and 'discipline'. Instead, we should redefine this cluster of concepts, which we can hardly do without when discussing questions concerning art and image making.

In the most general terms, '*mediation*' and '*medium*' refer to the representation and transmission of that special material called meaning by means of a particular channel of communication. In contemporary art historical discourse 'medium' refers either to the *physical materials* which constitute artistic expression, or to a group of *communicative forms and practices*, comprising traditional artistic media like painting and photography as well as mass media like TV and film (Harris 2006: 191). Sometimes this discourse operates within older paradigms of disciplinarity and 'medium-specificity'; at other times it draws on the new media discourse in which a 'medium' is often understood to be an apparatus, that is to say, a system of relations or a heterogeneous ensemble of material, technical, institutional, economic, discursive, social and aesthetic elements (Bolter og Grusin 1999: 16).

To anticipate a later point in my line of argument, I would like to suggest that Richard Grusin and Jay David Bolter's theory of remediation offers a deconstructed concept of mediation, which enables us to conceive mediation and image making as hybrid and transformative processes rather than as physical materials or mere 'transmission channels'. And so does the concept of transdisciplinary imaging. I take the latter to be a kind of non-concept, that is to say, a signifier without a pre-defined, normative signified or an as yet undefined concept which the conference speakers are invited to fill with a possible meaning.

As everyone remotely familiar with Western Art will know painting has for centuries taken up the position as the master discipline in the Western hierarchy of the fine arts. Accordingly, painting was and still is the epitome of artistic disciplinarity. Thanks to modernist art theory, painting has also been regarded as the ideal medium for exploring the means of a discipline – its medium-specificity - within the strict limits of the discipline itself. It is perhaps due to this modernist legacy that people have been hesitant to

acknowledge that painting has expanded its field considerably over the last decades. Since the 1960s painting has increasingly defined itself as an interdisciplinary, expanded field of painting. This expansion has primarily been achieved by means of intermediality and crossovers between various artistic media: between painting and photography, painting and sculpture, painting and readymade, painting and installation or painting and performance, to mention the most common types of crossovers.

The idea of an 'expanded field' originated in Rosalind Krauss' seminal essay 'Sculpture in the Expanded Field' from 1978. For Krauss, an 'expanded field' is a ground for exploration of innovative interrelations and combinations between fundamentally different categories. It is not synonymous with a boundless and eclectic assimilation of new stuff. It is more recent art criticism that has given the term this diluted meaning. According to Krauss, the crucial difference between a discipline and a field is not greater variety of expressions and materials, but the fact that the transformation of the discipline into a field gives the discipline a new set of cultural terms and structural principles with which to work. As a result, it develops a heightened awareness of the interrelations of media, i.e. their *intermediality* (Petersen 2010a: 15).

The invention of photography and film in the 19th century spurred a historical development, in the course of which painting would eventually lose its leading position in the arts as well as in the culture of images at large. As a result, painting entered into a new relationship of exchange to the cultural codes of technical images and mass media. Since the 1990s painting has also met the challenge of pondering anew the role of painting in a context of ubiquitous digital media and the mediating functions of the Internet. As the German new media artist and theorist Peter Weibel has phrased it, "We live in a sea of mediated visuality." (Weibel 2010: 46)

I would like to suggest that the transformation of the discipline of painting into an expanded field has not only liberated painting from the restrictions of a classical repertoire of materials and genres, enabling painting to transgress its traditional historical limits. It has also released a tremendous potential for image making that takes painting as a point of departure but moves far beyond the dialogical limitations of intermedia. I have chosen to approach the issue of painting's potential for transgressing its own disciplinarity by using two theoretical concepts as stepping stones to an apprehension of painting as a *transdisciplinary activity*, i.e. painting defined as *a critical remediating process*, or, as the title of my paper suggests, painting as *remediated* painting.

The first stepping stone is the idea of painting as 'pittura immedia' developed by Peter Weibel. His essay "Pittura Immedia: Painting in the Nineties between Mediated Visuality and Visuality in Context" from 1995 is one of the most perceptive surveys of the ways in which 'painting' was transformed when artists started to appropriate images and techniques from mechanical and electronic media, and more recently, the computer and the Internet. The second stepping stone is the concept of remediation as it was first suggested and defined by Bolter and Grusin in their book *Remediation: Understanding New Media* from 1999.

Thus, the overall ambition of this paper is to investigate the critical potential of remediated painting using works by three Northern European artists as testing ground for my

argument. In this context, *'critique'* has a double meaning. It should be understood to be the self-critique of the disciplinarity of painting and the related notion of autonomous art forms; but is should also be understood as the critique of the democratized visual culture of techno-mediated images. My point is that in remediated painting, the two meanings of critique – self-critique and cultural critique - are interrelated, as demonstrated by the works of the three artists I have chosen as my examples:

The first artist is the Dane Thorbjørn Lausten who started as a painter in the late sixties, moved into kinetic art and electronic sculpture and then on to what we usually call 'new media art'. He is one of the few Danish artists who has investigated the field between art and technology consistently and in an international context. In the last two decades he has made a series of data projections based on scientific data. One could perhaps describe this part of his work with the title of the conference series as consisting in a transdisciplinary imaging positioned at the intersections between art, science and culture.

The second artist is the German painter Katharina Grosse. She creates huge site specific installations, spraying paint on monumental sculptural objects or on the exhibition space itself. In this way she redefines the very concept of '*a* painting' or '*an* image' as she transforms the painted artifact into a space or a place that the visitor must enter and pass through.

My third example is the British artist David Bachelor who is also a writer and a graduate of Birmingham's interdisciplinary Centre for Contemporary Cultural Studies (Holman 2007: 46). Since the late 1990s, he has concentrated on colour in urban environments, and this interest in colours is apparent both from his works and his writings. In 2006 he summed up the ambiguity of his relationship with painting in a way that seems to me to articulate a dilemma that many contemporary artists are confronted with,

> "My relationship with painting is ambivalent. I use the term in its strict sense, which is […] motivated by […] a simultaneous attraction to it, and repulsion from it. […] I work in a studio and my work in studios is certainly informed by painting. Even if my work is mainly three dimensional and some would call it sculpture, but I don't think I would. Painting still informs it more than anything else. I can't get away from painting entirely, at the same time I can't do it." (Batchelor 2006/7: 1)

I have chosen these three artists, firstly, because I consider them to be radical artists that push back the frontiers of painting. Secondly, because they hold very different positions in today's expanding field of painting. Introducing the diversity of this field by way of a few examples does not enable me to *cover* the whole spectrum, but hopefully to *un*cover some important strands of transdisciplinarity. To simplify in order to clarify, one could say that Lausten's approach is constructivist, Grosse's approach is phenomenological and Batchelor's take on painting is materialist.

I will now pick up my theoretical line of argument by returning to my first stepping stone. Peter Weibel fuses the words 'immediate' and 'mediation' in the word *immediation* to describe what happens when various kinds of technical images are integrated in a painterly practice. Following Weibel's definition, immediation refers to a process of travelling through a number of different media, which results in a 'painting' – in the widest sense of the word – that rearticulates the question of the nature of the visual and the

image with an emphasis on its mediated, coded and contextual nature. *'Post-medial painting'*, as Weibel also labels this kind of second-order painting (Weibel 2010: 59), reacts immediately to the media as phenomena of the empirical world. It aims at transcending them in order to pave the way for 'a transformed spontaneity of the second order'. Thus, post-medial painting is 'not painting as underbidding the media, but as outbidding them, moving beyond.' (Weibel 2010: 59)

Peter Weibel defines immediation as a dynamic and transformative process of channeling. This understanding of mediation seems very close to the concept of remediation introduced in the discourse on new media only a few years later by Bolter and Grusin. Symptomatically, the two media theorists do not refer to Weibel's theory of painting and immediation, despite the fact that they often refer to painting as a medium of historical importance. Since the mid-1990s, new media and ICT (information and communication technology) have become important forces for creative culture and economic development. Supporting institutions such as Ars Electronica, ZKM and Eyebeam that position themselves at the intersections of art, science, and technology, have also expanded. Simultaneously, mainstream contemporary art has experienced dramatic growth, propelled by the proliferation of venues like art fairs and biennials and by the creativity of artists, curators, dealers and critics. However, as these two art worlds rarely meet their discourses have increasingly diverged. As a result, their discourses seldom deal with the question to what extent new media art and mainstream contemporary art are commensurable. Hence, my presentation is a modest contribution to the construction of a hybrid discourse that offers insights into each and at the same time enables a greater exchange between them.

Bolter and Grusin developed their theory of remediation as a response to the pervasive conviction among new media critics that the representational power of the computer and its associated digital technology must be fundamentally different from earlier technologies, especially from television and film. In *Remediation* the two authors refute this digital essentialism and argue that, like all media introduced in the last two centuries, digital media depended for their cultural meaning on the context of older media forms from which they have emerged (Bolter 2007: 196-197). The theory of remediation explains how a new medium '*refashions*' (Bolter og Grusin 1999: 14) a predecessor in the sense that it 'reforms' and 'improves' a predecessor on the level of content as well as form, while still being marked by the presence of the older medium in either acknowledged or unacknowledged ways. This is particularly clear in the CD-ROM multimedia with its mosaic of other media. It is also visible in the windowed style of the graphical user interface in which different programs, representing different media, can appear in each window (Bolter og Grusin 1999: 46-47, 59). Bolter and Grusin also explores how a new medium subjects its predecessor to '*repurposing*' (Bolter og Grusin 1999: 50), the idea being that a new medium borrows from an older medium in order to fulfill a new purpose, for example when broadcast television is transformed into interactive digital television in order to motivate and engage viewers (Bolter og Grusin 1999: 59).

The term remediation has also been included in the discourses on contemporary art where it is often construed as a historical progression in which recent media refashion older ones in order to fulfill new purposes or reach other audiences. It is mostly used to describe how digital art refashions its predecessors, for instance when artists such as the Italian artist

duo Eva and Franco Mattes use online worlds like Second Life to stage their works. In their series of *Synthetic Performances* Eva and Franco Mattes used their avatars to reenact a number of historic performances by well-known artists in Second Life (Andersen 2009; Quaranta December 2007). Bolter and Grusin's concept of remediation is actually rather broad and comprises four different meanings: In addition to 'refashioning' and 'repurposing', remediation can also mean '*representing*' in the sense that a new medium can represent an older medium, for example when a website offers pictures or texts for users to download. A fourth definition is that new media '*borrow*' from older media, like when a painting incorporates a motif from an older painting. Following this line of thought, Picasso's paraphrases of Velasquez' *Las Meninas* would be a remediation, and so would most of what is known as staged photography. The last two definitions are of minor relevance to the issue of transdisciplinary imaging. Moreover, they do not really add anything to what has for decades been framed theoretically by concepts such as representation, paraphrase and appropriation.

As Bolter and Grusin point out, their theory of remediation is 'a genealogy of affiliations, not a linear history, and in this genealogy, older media can also remediate newer ones.' (Bolter og Grusin 1999: 55) The last observation is part of an argument that eventually turns the authors' idea of remediation in digital media into a general idea about all media. Thus, Bolter and Grusin asserts that, '*all* mediation is remediation' (Bolter og Grusin 1999: 55) They add that they do not mean this in the sense that this should be a universal truth. Their observation applies to a specific historical situation created by the wealth of possibilities of remediation emerging with digital information technology. Bolter and Grusin claim that as remediation has developed into a *general* cultural condition, it also offers us a means of reinterpreting the work and discourses of older media. The authors do not pursue this line of inquiry apart from adding a causal explanation: while new technologies of representation proceed by reforming their predecessors, older media struggle to maintain their 'legitimacy' by remediating newer ones (Bolter og Grusin 1999: 61). Thus, according to the two media theorists, innovation comes from new media, whereas older media can only struggle to 'maintain' what is already there. As we shall see, contemporary painting proves them wrong.

Nevertheless, the theory of remediation opens up the possibility that *we could imagine the remediation process in reverse*. So, what happens if we understand remediation not only as new media using old media, but also as something that older media can do with newer ones? This would not only draw attention to the speed with which new media forms get assimilated into already existing cultures. It would also – and this is far more interesting – enable us to understand and recognize that a medium that continues to function as an apparatus for image making is not frozen in time. It remains a *dynamic* medium that contributes to the refashioning and repurposing of image making.

I would like to suggest that we can give more exact descriptions of what happens when painting is cross-fertilized with more recent media if we conceive of the vaguely defined 'expanded field of painting' as remediated painting. This would amount to a return to Rosalind Krauss' definition of an expanded field under a new name, which reflects the huge impact of new media in contemporary culture. Now then, what is to be gained from this re-conceptualization of 'the expanded field of painting' as 'remediated painting'?

Firstly, it introduces a concept of painting that starts from the *trans*disciplinary potential of painting instead of its historical disciplinarity and the attendant assumption that, as a discipline, painting functions independently and establishes its own separate space of cultural meaning.

Secondly, it conceptualizes painting as an active, performative and migrant participant in the cultural, commercial and scientific contexts in which it is embedded. It suggests that contemporary painting is active as a cultural force, not just as so-called autonomous 'fine art'. The term remediated painting suggests that painting has become a transdiscipline or a travelling medium[1] that moves between or into a range of different media refashioning and repurposing these media as well as painting. It follows that remediated painting is also synonymous with a process of *becoming painting* rather than with a firmly established state of *being painting*.

The claim that painting – so often declared dead and obsolete – is active as a cultural force needs to be substantiated. As the British painter Joan Key has pointed out, IT screens are not paint, and yet they are pictorial, and the vocabulary of abstract painting has participated in devising their visual language by 'generating recognition for groupings and sequences of planes and edges in superimposition.' (Key 2009: 557) Drawing on John Roberts book *The Intangibilities of Form: Skill and Deskilling in Art After the Readymade*, Key locates the origin of this interface between painting and IT screen in early modernist painting. She makes clear that abstract modernist painting wasn't only about medium-specificity and essentialism as it became during and after the Second World War.

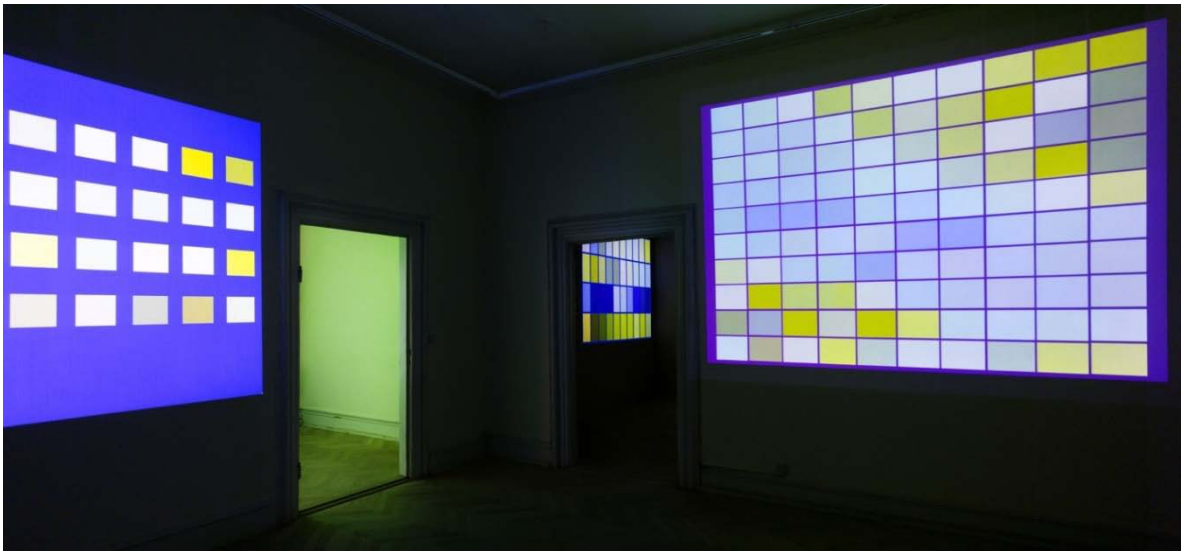
Around the time of the First World War visual abstraction was a potent response to the needs of industrialization. Artists such as Alexander Rodchenko and the Soviet Productivists, Joseph Albers, Paul Klee and other Bauhaus School teachers saw painterly abstraction as a communicable, 'transdisciplinary' formal resource, and they developed a non-figurative language that was also adopted in graphic design and industrial production (Key 2009: 558). My point is that the diffusion of modern 'artistic techniques' into what John Roberts calls the 'general social techniques' of productive labour has quite a long history. With the spread of IT screens the question of the transmissibility of painting into other media has become topical again. In this context, the role of painting as a 'general social technique' does not depend so much on the material nature of the traditional painted object. It is rather a question of visuality and sensation. As Joan Key puts it, 'what is it, in the immediate material sensuous being with painting, that can be re-given as sensation rather than image?' (Key 2009: 562).

To approach this question it is helpful to turn to some examples of remediated painting. In what follows I will primarily concentrate on Thorbjørn Lausten. I will focus on how he situates himself at the intersections between art, science and culture. I am particularly interested in how he uses scientific data to approach the classical questions of the relation of art to reality and of culture to nature in a new way. It is indeed his inclusion of scientific

[1] My notion of remediated painting as a transdiscipline or travelling medium is indebted to Mieke Bals notion of travelling concepts, see the introduction in: Mieke Bal, *Travelling Concepts in the Humanities: A Rough Guide*, Toronto, Buffalo, London: University of Toronto Press 2002.

data that enables him to ask critical questions concerning the boundaries between aesthetics, knowledge, science and technology.[2]

To call Lausten's data visualizations 'paintings' would be misleading. Conversely, you risk missing the point if you ignore that painting - historically the privileged medium of imagination – is crucial to the meaning of his work. It is this connection to the apparatus and aesthetics of painting that account for their intended effect on the audience. I will show a short video clip to give you a mediated impression of the immediate sensory effect of his work. It is from his exhibition *Magnet* which could be viewed simultaneously at ZKM/Center for Art and Media in Karlsruhe and two Danish art institutions. It contained visualizations of magnetism and infrared radiation. The projected images were based on continuous data streams received via the Internet from a geostationary satellite covering four geographic areas.[3]



1. Thorbjørn Lausten, *Magnet*, 2008, installation shot from the exhibition at the Museum of Contemporary Art, Roskilde, DK. Photograph: Anders Sune Berg.

Lausten's data visualizations are dynamic images that undergo transformation in real time. His works do not 'consist of' images but rather *perform* systems of relations in which data is transformed into images by means of algorithms and information technology. In this process his systems of relations become visual systems accessible to the senses (Søndergaard og Weibel 2008: 8). On several occasions Lausten has collaborated closely with scientists like the Danish astrophysicist Ib Lundgaard Rasmussen. Together they created *Now – the Polar Space* which is one of Lausten's most encompassing projects. A *leitmotif* of Lausten's work is the use of scientific data to create metaphors for the way knowledge and information about reality is transformed into images based on digital data. Lausten's view of scientific visualization is explicitly constructivist. Hence, his visualizations do not 'depict' reality in the sense that they are mimetic images of the visual world. On the contrary, they are critical explorations of how contemporary science increasingly makes use of visualizations to make a complex reality comprehensible. The main reason for the

[2] Thorbjørn Laustens homepage: http://www.luxpress.dk/engelsk%20html/engindex.html Accessed on 8 December 2010.
[3] Thorbjørn Lausten, *Visual System: Magnet*, DVD 2008. 80 min., Menues and introduction texts on the DVD are available in English, Danish and German.

growing importance of scientific visualizations is that scientists have to deal with huge amount of data and the emergence of complex issues, which can barely be understood unless given a visual form (Lausten 2008: 30). Well-known examples of this are medical imaging and the fractal geometry used for the mathematical simulation of clouds, waves, flowers and other natural phenomena. Such visualizations have paved the way for a new convergence of art and science, the cognitive and the sensory realms (Weibel 2008: 21).

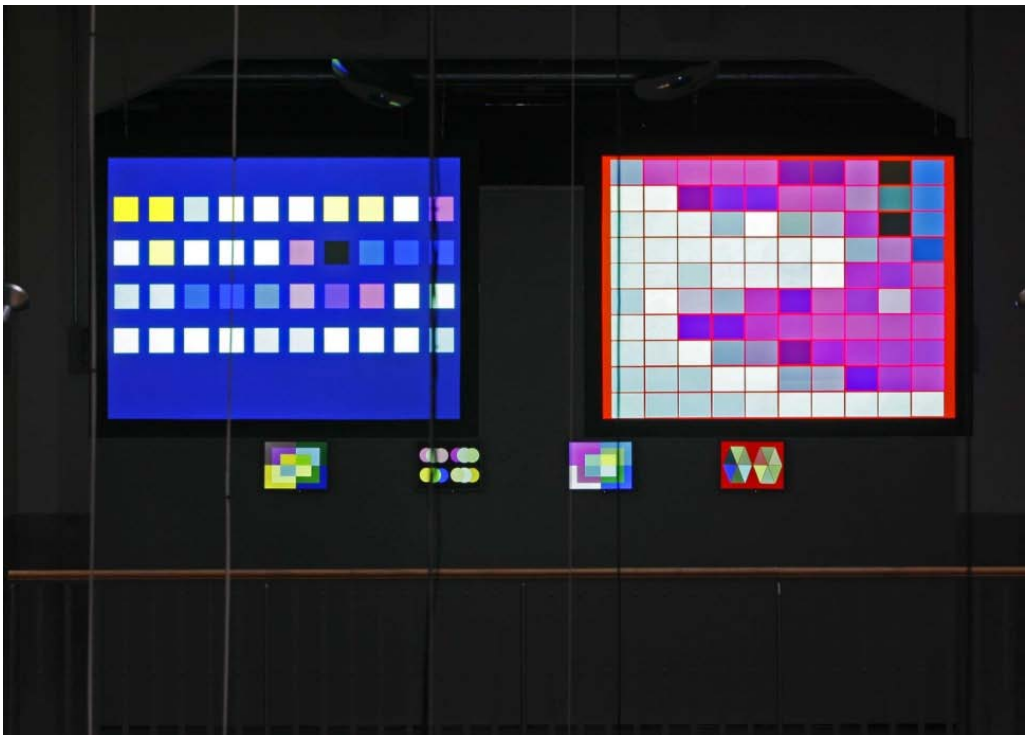
The aim of *Now – the Polar Space* from 1996 was to create 'a visual arctic space' (Lausten og Lundgaard Rasmussen 1996: 146). The installation consisted of 10 large computer-programmed wall projections of geometric images. The data had been collected by means of different kinds of technical equipment for measuring and observation, and it had entered into the project from different channels. Most of the data came from Copenhagen-based research institutes working on polar projects, mainly in Greenland. This input was used to program the content of each individual image and to determine the sequences of each projection. The projections visualized different phenomena: Magnetism, the geological formation of Greenland as a land mass, variations in the tides and ocean currents, and an analysis of the Greenland ice core revealing climate changes during the past 200.000 years. There were also visualizations of the ongoing changes of the weather and the ozone layer, changes in flora and fauna, and the migration of narwhals and polar bears.

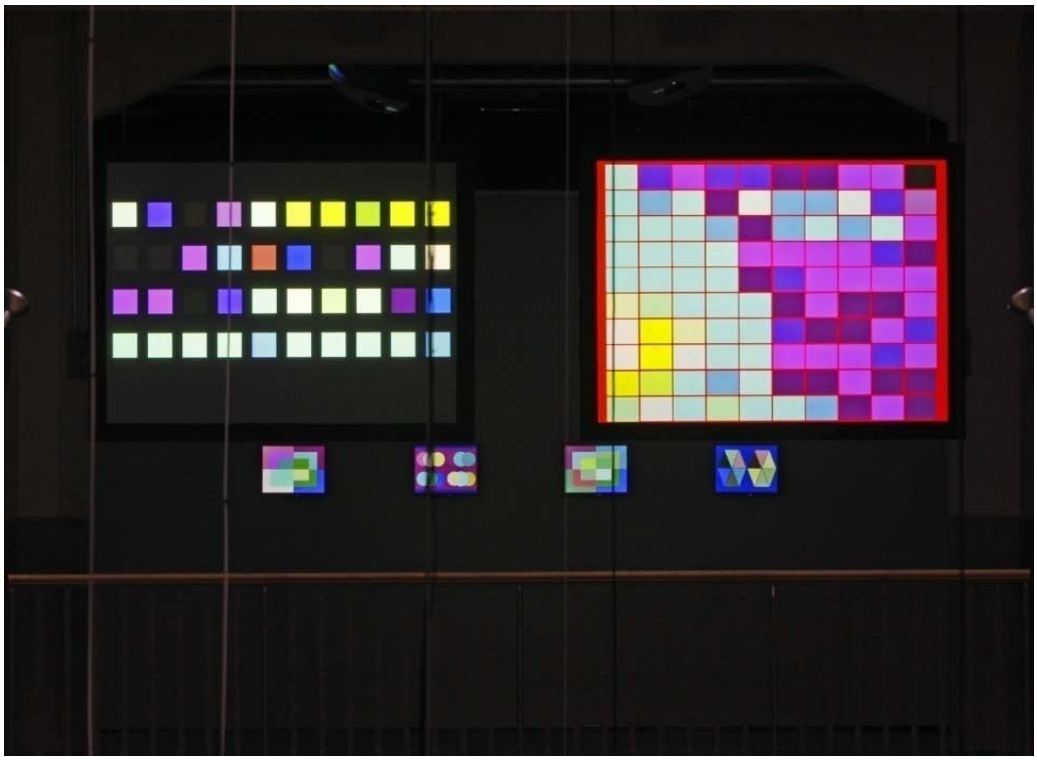
The phenomena and events spanned timescales ranging from a few seconds to 4.5 billion years, and they ranged from data transmitted directly to the exhibition via satellite and the Internet to data deriving from the creation of the Earth. The size of the phenomena displayed varied from individual animals and plants within a few square meters of arctic nature to the movements of the polar ice across the entire ice cap. Consequently time and space were relative to the phenomenon that the projection visualized (Lausten og Lundgaard Rasmussen 1996: 145-146). Taken together the projections constituted a sort of 'data-sum', i.e. an accumulation of data represented as a computer-generated arctic reality (Michelsen 1996: 150).

Lausten and Lundgaard Rasmussen used the same elementary geometric figures in all the projections in order to create a whole out of the different subjects. The recurrent figures were the cross, the circle, the triangle, the rectangle and the hexagon – figures that have been used so many times in widely different contexts that they are not associated with a specific meaning. Only when used in a specific context do the forms get a definite meaning. On each display a specific set of rules or algorithms determined which figures the data should create. For example, data representing a rising temperature would cause a figure to move upward on one screen, to change colour on a second, and on a third it could cause a change of form.

As the transformation rules were not displayed, viewers could not 'read' the data values off the screens and gain any factual knowledge about arctic nature. The visualizations presented themselves to the eye as animated abstract paintings. As a matter of fact, Lausten's intention was not to produce scientific illustrations and 'inform' his audience about Greenland. Visitors at the exhibition venue in Copenhagen did not 'see' the polar space. They experienced a displacement between two contexts: between Greenland as the source of data, and the installation as the source of the images. This displacement or

decoupling of the two contexts raised the critical question of the nature and status of scientific visualizations by demonstrating that data are not indisputable facts, but something people – in this case, scientists – interpret and construct, and that these data do not exist independently of a medium or a channel of information (Lausten 2008: 29).





2 + 3. Thorbjørn Lausten, *Magnet*, 2008, installation shots from the exhibition at ZKM, Karlsruhe, Germany. Photograph: ONUK

Moreover, the installation also made it clear that scientific visualizations are not only 'science', but also an aesthetic practice based on the transdisciplinary language of visual abstraction. According to Lausten, we have an obligation to investigate how they function and make up our knowledge of reality. Art has a special stake in this. On the one hand, it is partakes in the construction of knowledge and visualizations; on the other hand, art can also act as a critical investigator of these constructions. As Lausten puts it,

> "[…] I do not think it is any exaggeration to claim that art constitutes our knowledge. In this connection, art is not to be understood in terms of those kinds of platitudes popular among the general public but ought to be related to the term *téchne*, in its original meaning." (Lausten 2008: 32)

To sum up, Lausten redefines his work as an artist rooted in painterly abstraction by linking art to *téchne*, i.e. the ancient Greek concept of cultural activity as comprising craftsmanship as well as the disciplines later renamed art. In Lausten's projects *Magnet* and *Now – the Polar Space*, a painter's imagination and the formal means of systemic painting are cross-fertilized with techniques of scientific imaging. The resulting remediated paintings presented themselves to the eye as computer visualizations imbued with aesthetic 'painterly qualities' such as exquisite luminous colour schemes and aesthetically pleasing compositions. This is not an inter-media 'hybrid' of painting and computer images in the tradition from Warhol's silkscreen paintings and Weibel's 'pittura immedia'. Lausten accomplishes something else: His analysis of how scientists construct images of the empirical world by using computer technology reinvents painting as a kind of meta-critique of scientific discourses and imaging.
In recent years a remarkable number of painters have begun to explore the possibility of developing painting in the opposite direction of digital virtual spaces. Today, much of the experimental energy is put into exploring the physical and tangible *spatiality* of painting. Artists are investigating painting's relations to objects, space, place, and the 'everyday'. In doing so, they are remediating 'painting' through more recent art forms like the readymade, site-specific art and installation art. The techniques of installation art have added a wide range of expression to the palette of artists such as Katharina Grosse who uses the spatiality of installation art to translate painting from plane to space and wrap the work around the viewer as a tree-dimensional environment. Thus, her works elicit the more bodily and performative type of response typical of installation art. One could say that she creates a usually temporary stage-like event, and that this event or spatial situation gives substance to the dream that illusionistic paintings have always played on: The dream of literally walking into the painting in order to explore it more thoroughly and empathise more deeply with it (Petersen 2010b: 132). Grosse accomplishes a refashioning and repurposing of painting by integrating the physical world in her works. She uses the space of buildings – walls, partitions, floor – as painting surfaces, and sometimes also physical objects and the materiality of soil. In this way, she involves the visitor intensely on the sensory as well as the cognitive level.

In 2009 she made a site-specific long-term installation that transformed the 150-meter long Art Axis at the museum Arken into a brightly coloured imaginary world. The exhibition was entitled *Hello Little Butterfly I love You What's Your Name*, and was the second in a series of three exhibitions on the topic of Utopia. Grosse tied paintings, sculptures and large mounds of earth together with monumental site-specific paintings executed directly on the walls and floors so that the solids of architecture dissolved into optical illusions. The installation offered the visitor the joy of going away, of leaving grayness and entering

colour. As a celebration of escape, it could be seen as a physical staging of a basic utopian impulse: the desire for 'something else', for 'elsewhere'. By means of visual abstraction, atmospheric colour effects, elliptical and rectangular paintings, earth and rocklike sculptures the installation constructed a possible universe, where the experience of shifting betweens changing pictorial levels blurred the boundary between physical and imaginary space. As Marie Laurberg, the curator of Grosse's exhibition, has pointed out, 'We are not in one or the other but in both, at the same time: We are in a space between the actual space of our surroundings and a dreamlike world of possibility, conception and fantasy.' (Laurberg 2009)

For her paintings Katharina Grosse uses a standard tool of house painters and graffiti artists, the 'mechanised brush' of the spray gun.[4] Contrary to house painters and graffiti artists, she paints with very good pigments thus bringing together the sphere of fine arts and the everyday. She uses the spray gun as a mediating device that introduces a cool distance between the hand of the painter and the surfaces she paints. She also uses it as a means to enlarge the gestures of the hand, making them bigger and more powerful than the physique of the human body allows. Thus, what the spray gun leaves, is more than life-size traces of a body moving in space and time. It is macro-imprints of a painter's performance. (Petersen 2010b: 132) As a result, her installations emphasize technical and mechanical mediation *while at the same time* giving priority to the haptic and bodily qualities of sensation that are so often excluded from the visual experience by the slickness of many techno-mediated images.

Returning to Peter Weibel's thoughts on immediation, one could say that Grosse's remediated painting introduces an overwhelming vibrant materialism capable of outbidding the sensory impact of both easel painting and installation art because it engages the visitor intensely on a phenomenological level. Skeptics would perhaps argue that Grosse's work is simply too beautiful and pleasurable to be critical, too. But this judgement would ignore the fact that we are simultaneously attracted to and repelled from very strong, raw colours such as those of Grosse's. It would also fail to see the way she destabilizes the habitual perception of easel painting. While drifting through an installation, the visitor's point of view is shifting with the movement, which means that there is no right way of looking at the spatial situation. The privileged, centered viewing-position offered by easel painting has been eliminated, and the viewer set in motion in more than one sense: As opposed to graffiti, with which her work is sometimes compared, Grosse's work is not about making claims on certain areas, taking possession of them. On the contrary, she invites the visitor to trespass – to walk into, even *on* the painting. Thus, it is more about making the visitor feel the freedom involved in trespassing than about marking borders.[5]

Crossing borders is also essential to David Batchelor. He is an artist with a double involvement: On the one hand, he makes interventions in the everyday and engages with a multitude of readymades found in urban environments; on the other, he is deeply engaged in a painterly exploration of colour, especially the monochrome – a cornerstone

[4] Grosse's works are also mechanically and technically mediated by the technically demanding moulding procedures necessary for the fabrication of the Styrofoam elements. After Grosse has made a sketch for the element in question, an engineer makes the necessary calculations, and together they make the final technical drawing, which is then sent to a company specialized in building boats etc.

[5] Grosse in interview made on the occasion of her exhibition *Hello Little Butterfly I Love You What's Your Name?* *http://www.arken.dk/content/dk/udstillinger/utopia/katharina_grosse/film_om_katharina_grosse*. Accessed on 17 September 2010.

of modernist painting. The two types of engagement intersect in Batchelor's suite of *Found Monochromes,* begun in 1997. Now and then Batchelor would drift through London, stopping to take photographs of monochromes *in situ*. Batchelor's photographs capture single square and rectangle planes of uninterrupted white; they are informal and shot from a uniform distance so that the white planes are seen on different backdrops: brick walls, car doors, metal fences and more. In this way, Batchelor demonstrates how the monochrome can be a readymade and highlights how it is 'sited' or 'embedded' in our daily environment (Coles 2000).

The readymade is perhaps the most common means of remediation in modern art. Artists have combined painting and sculpture with readymade elements to refashion these media ever since Picasso made his first collage *Still Life with Chair Caning* in 1912 (Coles 2000). Moreover, the readymade is a reminder that the artist never starts from a *tabula rasa*; there is always something there already. In Batchelor's works, this 'something' that is always already there, is globalized consumer culture. His physical material is often objects that are colourful and luminous in and of themselves. This preference for coloured mass produced objects is a token of the interest he takes in the way our experience of colour has been transformed in the past 100 years primarily through electrification and petrochemicals (Holman 2007: 44). In 2007 he created the installation *Unplugged consisting of* 23 hairy columns or trees made from thousands of cheap brightly coloured plastic things bought in pound shops in London, Edinburgh, Glasgow and Sharjah in the United Arab Emirates. These plastic clips, toys, cutlery, toilet brushes and feather dusters were all made in China, but distributed worldwide thanks to today's global economic exchange (Barley 2007). Batchelor's artificial wood of plastic trees pointed to the visual splendour of our everyday objects, but also to the almost repulsive garishness and chromatic flatness that surrounds us all the time in urban environments, and to the aesthetic homogenization brought about by globalized consumer culture.

Batchelor's interest in how we experience colour in an urban environment is also pronounced in *Brick Lane Remix 1* from 2003. In this installation he grouped together a collection of second-hand light-boxes and shelving units in order to create awareness in the viewer of the omnipresence of electrically and chemically generated colours in everyday experience. The electrical shop signs were found in the Banglatown area of London. The title refers to the side street of Brick Lane, notorious for prostitution, Jack the Ripper and more recently, curry houses. The installation captures the brash and exotic essence of this locality by subjecting the electrical signs to a 'refashioning' and 'repurposing' that transform the glowing signs into minimalist screens of neon colours.

To conclude, remediated painting reflects on the position and role of 'the painterly' in contemporary culture. Lausten points to the aesthetic and chromatic qualities of scientific visualizations and invites the viewer to reflect critically on the reliability of their constructed 'truth'. Grosse makes painting an integral part of the physical environment that people move in, attempting to open our eyes to the freedom of trespassing. Last, but not least, Batchelor explores how the primary material of painting – colour – is omnipresent in everyday experience where it transcends all disciplinary borders and creates its own symbolic and aesthetic orders.

I think it would be an exaggeration to call their work 'criticism' in the strong political sense of the word. These artists are critical in the sense that they take a fresh and thoughtful, 'revisionist' look at things that we have grown accustomed to and take for granted. The art historian and cultural theorist Irit Rogoff has introduced a useful distinction between three types of critical engagement. The first type is *criticism* understood as a form of finding faults and exercising judgement according to a consensus of values; the second type is *critique*, understood as the analysis of underlying assumptions, and the third is *criticality*. According to Rogoff criticality operates from 'an uncertain ground of actual embeddedness', i.e. from a desire to *inhabit* culture and to participate in culture in a relation different from the critical analysis that intends to illuminate flaws and allocate blames (Rogoff 2006: 16-17).

Lausten, Grosse and Batchelor practice criticality as defined by Rogoff. They wish to inhabit contemporary visual culture, and they know that this is also the only thing one can do, considering the ubiquity of techno-mediated images: as Peter Weibel points out, 'We live in a sea of mediated visuality.'

Bibliography

Andersen, Christian Ulrik. "annoying japanese child dinosaur." In *enter action: digital art now*. Eds. Pernille Taagaard Dinesen og et.al. Århus: ARoS Århus Kunstmuseum, 2009: 101.

Barley, Nick. "Colour In." *The List*.580 (2007): unpaged. Online-journal: http://www.list.co.uk Accessed on 17 September 2010.

Batchelor, David. "GI symposium: Painting as a New Medium. David Batchelor." *Art & Research* 1.1 (2006/7): 1-7. Online-journal: http://www.artandresearch.org.uk/v1n1/batchelor.html Accessed 17 September 2010.

Bolter, Jay David. "Digital Essentialism and the Mediation of the Real." In *Moving Media Studies - Remediation Revisited*. Eds. Heidi Philipsen og Lars Qvortrup. København: Samfundslitteratur Press, 2007: 195-210.

Bolter, Jay David og Richard Grusin. *Remediation: Understanding New Media*. Cambridge, MA: MIT Press, 1999.

Coles, Alex. "David Batchelor and Liam Gillick: Monocromes of the Everyday." *Parachute*.100 (2000): 132-39.

Hall, Stuart. "Introduction: Who Needs 'Identity'?" In *Questions of Cultural Identity*. Eds. Stuart Hall og Paul du Gay. London, Thousand Oaks, New Delhi: Sage Publications, 1996: 1-17.

Harris, Jonathan. *Art History: The Key Concepts*. London, New York: Routledge, 2006.

Holman, Martin. "David Batchelor unplugged." *Art World* 1.1 (2007): 42-47.

Key, Joan. "Future Use: Abstract Painting." *Third Text* 23.5 (2009): 557-563.

Laurberg, Marie. "Opening Up Spaces Within Spaces." In *Katharina Grosse: Hello Little Butterfly I Love You What's Your Name?* Eds. Christian Gether og Et.al. Ishøj: Arken Museum for Moderne Kunst, 2009: 10.

Lausten, Thorbjørn. "Magnet." In *Magnet*. Eds. Morten Søndergaard og Peter Weibel. Heidelberg: Kehrer Verlag, 2008: 29-33.

Lausten, Thorbjørn og Ib Lundgaard Rasmussen. "now - the polar space." In *billeder fra det fjerne/images from afar*. Eds. Anders Michelsen og Frederik Stjernfelt. Copenhagen: Kulturby 96 in collaboration with Akademisk Forlag, 1996: 146-148.
Michelsen, Anders. "now - the polar space - an interpretation." In *billeder fra det fjerne - images from afar*. Eds. Anders Michelsen og Anders Stjernfelt. Copenhagen: Kulturby 96 in collaboration with Akademisk Forlag, 1996: 149-159.
Petersen, Anne Ring. "Introduction." In *Contemporary Painting in Context*. Ed. Anne Ring Petersen et.al. Copenhagen: Museum Tusculanum Press, 2010a: 9-21.
---. "Painting Spaces." In *Contemporary Painting in Context*. Eds. Anne Ring Petersen og et.al. Copenhagen: Museum Tusculanum Press, 2010b: 123-138.
Quaranta, Domenico. "Remediations: Art in Second Life." *hz journal*.11 (December 2007): unpaged. Online-journal: http://www.hz-journal.org/n11/quaranta.html Accessed 20 September 2010.
Rogoff, Irit. "Academy as Potentiality." In *A.C.A.D.E.M.Y.* Ed. Angelika Nollert. Frankfurt am Main: Revolver, 2006: 13-20.
Søndergaard, Morten og Peter Weibel. "Introduction." In *Magnet*. Eds. Morten Søndergaard og Peter Weibel. Heidelberg: Kehrer Verlag, 2008: 8-9.
Weibel, Peter. "From Data to Images and Back: An introduction to the Visual Sysems of Thorbjørn Lausten." In *Magnet*. Eds. Morten Søndergaard og Peter Weibel. Heidelberg: Kehrer Verlag, 2008: 11-28.
---. "Pittura/Immedia: Painting in the Nineties between Mediated Visuality and Visuality in Context." In *Contemporay Painting in Context*. Ed. Anne Ring Petersen et.al. Copenhagen: Museum Tusculanum Press, 2010: 43-64.

GROW: Visualising Nature at Nanoscale

Erica Seccombe, Australian National University

Abstract

GROW is a project in which I am investigating the aesthetic possibilities of computational extension of vision through 3D Microcomputed Tomography X-rays (Micro-CT) in the XCT Facility at the ANU Department of Mathematics. My intention for this project is to capture in 3D the dynamic process of propagating agricultural seeds, from embryo to first leaf stage. Micro-CT is conventionally static but there is now ground-breaking work capturing movement as an object is transformed; such as a seed sprouting from an embryonic state. I am visualising this data through a unique scientific volume exploration tool *Drishti*.

The premise behind capturing the germination of economic seeds - such as mung bean, corn, sunflower, soy and wheat - stems from my interest in agricultural philosophy and the issues raised about our future in the era of genetic modification. In thinking, researching and developing *GROW*, I am considering contemporary questions surrounding the comparative values between perceived natural and artificially cultivated food sources.

Through *GROW* I am attempting to merge science, technology, art and culture in an innovative way. By transcending conventional images of seeds germinating I am endeavouring to create new work that has meaning beyond a purely scientific interpretation of data.

GROW is the working title I have given my project, in which I am investigating the aesthetic possibilities of computational extension of vision through the process of dynamic 3D microcomputed tomography X-ray. My intention for this project is to capture in 3D the dynamic process of propagating agricultural seeds, from embryo to first leaf stage, and to use this visual data to create a series of projected digital media installations. I am collecting this 3D data during my 2010 artistic residency as Visiting Fellow in the ANU School of Physical Sciences and Engineering, facilitated by Associate Professor Tim Senden and his colleagues at the Department of Applied Mathematics' XCT Facility. My residency is supported by two separate funding bodies; first the artsACT new work grant through the initiative of the ACT Government, and second, The Australian Network for Art and Technology (ANAT) and the Australian National University, in association with the Australian Government through the Australia Council for the Arts, its arts funding and advisory body.

In order to describe the nature of *GROW* in the context of transdisciplinary imaging, I will clarify in this paper the combined aspects of scientific 3D visualisation and cultural subjects which have influenced my project as an artistic endeavor. Beginning with a brief overview of the questions surrounding contemporary microscopy and computational vision that drive my investigation, I will draw out issues that relate to my new work and interests in the topic of agricultural. With an explanation of my relationship with the ANU Department of Applied Mathematics and their research, which has inspired the development of my practice, I will discuss the technical capacity of 3D microcomputed tomography X-ray imaging in order to offer a better understanding of the transdisciplinary nature of my work. I will explain my engagement with this 3D computational imaging technology as an artist, and the effect of this experience on my current project. As *GROW* is still in early and experimental stages, I will describe the development of this new work in the context of my art practice.

My work is motivated by my continuing curiosity about the way contemporary microscopy imaging technology has influenced the visualisation of the structure of matter. As a visual artist I am interested in exploring the aesthetic possibilities and interpretations of this scientific data. In 1664 the English physicist Robert Hooke (1635-1703) published his prodigious book *Micrographia* which describes his investigations through a magnifying lens of his own construction. Hooke was the first person to utilise the word 'cell' to identify microscopic configurations and to observe a world yet unrevealed. 346 years later, frontier technologies such as confocal laser scanning, beamline synchrotrons, soft X-ray emission spectroscopy, atomic force microscopy and supercomputers have given scientists insight into the layers of cellular and sub-cellular structures beyond nanoscale. In turn, these images depicting the double helical structure of DNA, cell division, brain neurons and genome codes have become popularised and commoditised. As the continuing magnification of the microscopic is disseminated through contemporary mainstream media, it is in turn emulated and fictionalised as a way of describing the invisible, such as bacteria or hair follicles; this is evident in commercials expounding the virtues of moisturisers, toothbrushes, shampoo, house-hold sanitation products or even pain-killers. Placed in context of the age of digital enhancement and information saturation, my work explores the challenges we face interpreting this visual data, which is now presented to us on a daily basis.

Subsequently, my interest in microscopy visualisation has lead me to consider the science of biotechnology and the contemporary questions surrounding the comparative values between perceived natural and artificially cultivated food sources. For example, if one genetically modified and one heritage wheat grain were placed side by side, I would be unable to differentiate between the two. Many of us are so far removed from the physical cultivation of staple food crops that we may not even recognise either grain as wheat. To understand the complexity of biogenetics the average person would need to be presented with a digitised representation of the genetic structure of wheat grains, thus relying on a scientific authority to inform them of the grain's authenticity and nutritional value. As agriculture is a founding component of civilization the genetic modification of food is neither a simple nor a singular subject. I am beginning to explore how the phenomena and mythology of agriculture is understood, including ethics, genetics, history, tradition, socio-economics, trade networks, industry production, consumption and biodiversity.

In 2009 Dr Megan Clark, Chief Executive of the CSIRO, gave a presentation on *Sustainable Agriculture: Feeding the World*[1]*.* Discussing the concerns for increased food-insecurity, urbanisation and carbon-contraints Dr Clark described how these three forces combined will reshape the world as we know it. Warning that current crop yields will need to be doubled by 2050 to feed a global population, Clark predicted that to overcome the predominant challenges of reduced natural resources and threat of climate change, the forthcoming agricultural revolution will need to be directed by new technologies and genetic improvements. The premise of my project *GROW*, to capture in 3D the kinetic process of propagating economic seeds - such as mung bean, corn, sunflower, soy and wheat – is an artistic response to the growing phenomena of genetic engineering and plant phenomic technologies. While my investigation into these topics will inform my project, my intention is not to generate didactic images representing abstract, genetic permutations. I am looking to make work that provides a more tangible experience, creating a dialogue

about contemporary culture and the science and technology on which it relies. The germinating seed is a starting point.

For the purpose of imaging sprouting seeds I am utilising frontier scientific techniques and processes, 3D visualisation software and microscopic tomography X-ray (XCT or micro-CT). As Visiting Fellow, I have joined the team in the ANU Department of Applied Mathematics' XCT Facility who are conducting pioneering research in the field of X-ray microscopy. My proposal builds on the strength of the unique and collaborative relationship I have established with this Department since I joined them in an artistic residency in 2006. I have been privileged to benefit from the ongoing support and encouragement of the Department and staff of Vizlab at the ANU Supercomputer Facility. The Department includes physicists, chemists and mathematicians engaged in research of an experimental and theoretical nature. They are recognised for groundbreaking research into processes involving the computational imaging of complex materials and networks and their results have challenged theoretical knowledge of the structure of matter, including the established understanding of evolution.

The Department's range of optical technology and software has greatly extended their experimental capabilities and their XCT Facility offers the highest fidelity computer tomography available. It is supported by APAC, Australia's largest public supercomputer centre which maintains an enormous volume (several petabytes) of archival storage at the ANU. The 3D fabric of material, such as rock or bone, encodes the mechanical properties of the object and the complex interplay between structure, form and material composition can only be solved with a supercomputer. The portrayal of dense datasets is not a simple task and the Department aims to balance visual density with information content, recognising that this articulation requires guidance by a visual sense in combination with computational power. As a practicing artist I find this synergy between technology and vision inspirational, but I am conscious that the experimental opportunities I enjoy are possible due to the financial interest from the mining industry that drives the Department's core research program.

In 2004 the Department built and implemented a prototype micro-CT with the ability of imaging materials of various density and size, from a maximum of five-centimetre samples to a resolution of one micron. Computed tomography (CT or CAT scans) developed mainly from medical imaging and is now generally recognised by familiar images of body parts in thin slices. However, advanced 3D micro-CT is primarily identified as tomography created through computer processing of digital geometry to generate a three dimensional image of the internal and surface areas of a static object X-rayed around a 360 degree rotation on a fixed axis. A single dataset may contain up to twenty gigabytes of information, resulting in high resolution 3D volumetric data represented by voxels or points mapped within x, y and z coordinates. This data is then synthesised and then reconstructed by segmentation, which is the interpretation of this 3D image by a computer. These phases differentiate the various aspects of data such as solids, liquids and air, as a process of improving the clarity of the data. The more dense the original sample, the longer the process. As a non-scientist I play no part in the serious business of implementing algorithims for segmentation, but I think it is essential to understand how the data is acquired and visualised in order to plan and develop images for my project *GROW*.

As an end-user I have become independent in the acquisition and manipulation of these datasets through a unique purpose designed volume exploration software *Drishti*, so named by its creator Dr Ajay Lamay, meaning 'insight' or 'vision' in Sanskrit. This open-source software is continually upgraded with new features and it was developed specifically for the end-use of visualising tomography or electron-microscopy data, for both exploration and presentation. Its premise in visualisation datasets acknowledges that the information is equally important as conveying understanding to a research community or a lay-person. Importing raw datasets into *Drishti* enables the user to identify the essential material by trimming a clean sub-volume for rendering. The program's transfer functions distinguish between the material density of surface and sub-layer data through the process of elimination or enhancement, for example; separating nerves, veins, tissue and bone. There is a wide range of choice through colour, rotation, cropping, clipping, positioning and fly-throughs, with the additional function of a key frame editor to capture still images and create animations of any length. Since its inception in 2004, *Drishti* has improved considerably in terms of its user interface, but as a user I have discovered that visualising true volumetric data is an acquired skill. The ability to image a dataset is not a straightforward procedure if you are unfamiliar with interpreting volumes though histograms or navigating around a virtual 3D environment.

My recent digital media works *Ocular* (2006) and *Nanoplastica* (2008), were developed using *Drishti* as a result of my initial three-month residency in the Department. For these works I sought ways to emulate scientific research as a means of examining issues of visualisation and replication of the natural world, and to touch on concepts drawn from the sciences such as evolution, genetics, microbes and nanotechnology. I utilised the XCT Facility to take static scans of a selection of minature plastic toys representing mammals, insects and marine animals. Collectables from a brand of novelty chocolate, each toy is no bigger than three-centimetres and designed to be assembled by joining several parts together. I chose these objects because their potential to translate interestingly through X-ray. Rather than using specimens of real insects or invertebrates, my deliberate use of these ready-made objects juxtaposed the established understanding of what is natural and artificial, while acknowledging the history of artists' employment of quotidian objects as cultural commentary.

Visualising this data with *Drishti*, I created new meanings for these toys that extend well beyond the original reading of the object. Having lost the painted exterior, the interior structure becomes visible through transparency, and as the objects are animated they begin to realise a life of their own. In both *Ocular* and *Nanoplastica* I am also concerned with a perception of scale so the animations are projected as large installations, given available space. These works have been successful in that they challenge a preconceived notion of what a viewer is observing; interpretations range from real life microscopic organisms to nano-robotics. *Ocular* and *Nanoplastica* pay homage to scientific endeavor in a historical context, referring to early scientific representations and categorisation of nature, but ultimately they challenge our knowledge and perspective of the natural world.

In the time since my first residency, the XCT Facility has greatly extended its reach through refinement and improvement of resolution and decreased acquisition time. The current researchers have built and installed a new prototype micro-CT instrument that captures both the volume and length of the object; the axis rotates 360 degrees while

moving upward on a helical rotation, increasing the capacity for sample size. With these new capabilities they have embarked on an experimental project of 4D Dynamic XCT where the fourth dimension is the added property of time (3D + time). The acquisition of 3D data in cinematographic mode and the analysis of time evolution in microscopic 3D systems, such as water wicking through fibre or flowing through rock, is only marginally feasible at present and this group is working to patent a novel method for the rapid acquisition of kinetic 3D datasets. Generating eight billion volumetric data points, each possessing nine properties, into a meaningful image also involves deeper understanding of animation, colour and light.

As Visiting Fellow I have proposed a parallel investigation of Dynamic XCT through my project *GROW*, where I am collaborating with researchers to visualise and animate sequences of 3D data of sprouting seeds. The initial datasets of these seeds are entirely experimental, and in the process of acquisition I am facing a range of challenges that will inform and improve future kinetic sequences of seed growth. For the first scanning session we chose mung beans for their well documented propagation abilities, as the foremost challenge is to ensure that the seed actually sprouts throughout the duration of the X-ray process. For the first session three issues concerned us; how to provide hydration and nutrition to the seeds over an extended period of time within the confines of the XCT facility; how to keep a sprouting seed on a fixed axis, predicting that the possibility of sudden movement of the seed flipping over to take root will cause a blurring of data; and if there will be enough contrast with this organic matter to result in a worthwhile image. Several beans and a radish seed were prepared by soaking overnight and then being placed in a canister of agar; out of three one mung bean and the radish sprouted.

Currently I am working towards the acquisition of sixty rotations that make up this one sequence of the mung bean growing over a nine-hour period. The first image shows the bean at the point of germination and the last image is of an expanded bean with a five-millimeter sprout. The individual revolutions ranging in between these values capture the accelerated phases of growth and I envisage that these sets will be combined to create a time-series animation of the event. The difference between conventional time-lapse photography and dynamic XCT is that I am able to view the internal structure of the bean as it begins to grow. Many of us would have some idea of what a seed looks like when it germinates, through first hand experience or social media. We are not generally required to visualise the changing shape of the embryo beneath the testa, or seed coat, as the plumale expands outwards and the cotyledon, the first leaf, begins to form within. I certainly had no preconceived idea, and to this effect this project differs from the previous scanning of inert objects where I could anticipate the crisp lines of the internal plastic structure. In the context of scientific research, this new insight into the secret life of a germinating mung bean is unusual, perhaps unprecedented.
What I can see, after isolating the bean from its agar base and peeling away the spongy flesh in *Drishti*, is the delicate architecture beneath the fuzzy skin of the testa. Curious bubbles of gas form as the coyledon expands and fluid draws up, distorting the curved base of the bean. The plumale looks rather sexual as it lengthens, searching for a suitable place to take root. With this technology I can enter the bean and examine the internal walls, looking through its transparent flesh, out into the virtual space beyond. With these first exciting glimpses I envisage an exhibition of animated digital projections that enables an audience to fly through the virtual seeds and experience the internal structure as it

germinates, travelling along the new shoot as it grows. Employing a variety of new media technologies and installation techniques, including perhaps 3D display screens requiring an audience to participate with 3D optical glasses, I will explore the many possibilities of perspective to make *GROW* a unique experience.

The final outcome of my project will be determined by the nature of the technology available to me, and the challenge will be to create a work of art that will survive long after this technology is superceded by new inventions. While my project will not set out to provide solutions or answers in relation to genetically modified crops and a sustainable future, I am nevertheless committed to developing a creative work that contemplates our values and preconceived notions of food crop cultivation, particularly focusing on urbanised societies that are becoming increasingly removed from the cultivation of food. By transcending conventional images of seeds germinating, and pushing this work beyond a purely scientific interpretation of data, I hope that it will succeed in merging science, technology, art and culture in an innovative way while preserving the moment of awe and discovery of seeing something ordinary in a new way and for the first time.

1. "*Sustainable Agriculture: Feeding the World",* Clark.M. Adapted transcript of a speech delivered to the *Science and Technology in Society Forum*, Japan, on 6 October 2009. http://www.csiro.au/science/Sustainable-Agriculture-Feeding-the-World.html

Contemporary Hybrid Painting: The Aesthetics of a Post-Medium Condition.

Dr Mark Titmarsh
University of Technology, Sydney

The broad history of painting has involved several radical morphological shifts exemplified by the passage from primitive cave painting through medieval church painting to modern easel painting up to contemporary hybrid painting. Through each age the shedding of one aspect of painting, shamanism, spirituality, portability has resulted in a shift from sacred static images towards profane ephemeral events.
This transformation has intensified over the last century where the repeated announcement of the death of painting has seen painting reborn as a mode of self questioning, separating off from itself so as to find new ways of being painting.

The drive to get beyond the image based nature of painting begins in the first decades of the 20th Century when avant-garde artists become as concerned with the form of the work as they are with its contents. Aspects of representation that might have been confined to the flatness of an illusionary surface are detached as general principles and applied to concrete materials and situations resulting in the conceptual deconstruction of painting and a tendency towards installational object based practices.

To show this is part of a drive towards hybrid painting I am going to slice through art history at a different angle, using known events to arrive at a different view, a different outcome.

The Prehistory of Post Painting
The first sign of the shift from easel painting to something else begins with Picasso's cubist work and Duchamp's readymades. Cubist artists became so vigorous in their rejection of Renaissance conventions that 'contrariness' or complete inversion of dominant rules became a hallmark. Thus voids replace solids, opaque objects become transparent, and so on. It was in this kind of mood that the flatness of the surface of painting became solid and the wetness of paint extended to include dry matter such as paper, rope, wallpaper, sand and so on. These physical extensions out from the painted surface became known as collage, *papier colle* and 'cubist construction'.
Consequently works made from cardboard and string like Guitar appear to be a spatialised extension of cubist painting that simply discards any need for canvas, paint, and a 'flat rectangular background'.

[1]

Duchamp's readymades appear in the same Parisian avant garde art scene in 1913 as something of a response to Picasso's synthetic cubist works where the traditional materials of painting are replaced by objects of mass production such as newspaper clippings, printed fabric, wallpaper and even rope. In his most famous work from that time "Still life with Chair Caning" (Fig. 2), Picasso bordered the oval painting with thick maritime rope.

[2]

Concentrating on these 'extra-mural' objects populating the surface and perimeter of painting, it does not seem an enormous step for Duchamp to go from rope to bicycle wheel (Fig. 3).

[3]

While many artists took the innovations of cubism in the direction of pure painting or abstraction, Duchamp opted for an ambiguous abandonment of painting that continued to pose questions for painting.

---

[1] Picasso, Guitar, 1912-13, cardboard and string
[2] Picasso, "Still life with Chair Caning" (1912)
[3] Duchamp, Bicycle Wheel (1913)

Challenging the presumptions of painting has a long history, whereby generations of artists have abandoned some aspect of painting considered sacred by years of conventional practice. Thierry de Duve lists some of them:

> "The abandonment of chiaroscuro by Edouard Manet, of linear perspective by Cezanne, of Euclidean space by the Cubists, of figuration by the first Abstractionists, down to the figure/ground by many generations of monochrome painters."[4]

Each abandonment serves to question what painting has been, and to install self overcoming as an important aspect of painting itself.

So by abandoning painting Duchamp is not affirming that painting is dead as a discipline, not even that it is dead for him as a personal interest. Whether painting has a future, as something yet to come, something 'not *yet* happening', is the very question incubating somewhere inside the readymade.

The readymade is not a painting because there is nothing of painting in it, no paint, canvas, image, surface, or frame. Yet the readymade might almost have been a painting, a possible painting, since it was conceived by a painter, in the context of avant-garde painting, as a way of saying something about painting.

Some 50 years after Duchamp's first readymade an entire generation of artists took up a renewed attack on painting. The result in the 1960s was an enormous migration away from the craft of painting into new practices defined negatively in relation to the medium of painting.

In fact all the major artists, Ian Burn, Donald Judd and Robert Smithson who came to prominence in Conceptual Art and Minimal Art followed in the steps of Duchamp in that they trained as painters and then abandoned painting for the sake of establishing new frontiers.

However in all their work some trace of painting remained, some indeterminacy between painting and not painting. For Burn and Judd it was an unbroken interest in colour and the continuing presence of quadrilateral easel like forms. For Smithson it was liquified forms and the ambiguous reflected images provided by mirrors that was reminiscent of painted illusions on canvas.

By the late 1970s painting was long forgotten and it was sculpture's turn to be measured against the historical requirements of the day. Ironically it is out of the demise of sculpture and its rebirth as expanded sculpture that a new practice and discourse for painting is possible.

The Genesis of Expansion

Writing in 1979 in her seminal essay, "Sculpture in the Expanded Field", Rosalind Krauss noted that,

> "rather surprising things have come to be called sculpture: narrow corridors with TV monitors at the ends; large photographs documenting country hikes; mirrors placed at strange angles in ordinary rooms; temporary lines cut into the floor of the desert." [5]

In the 1960s with the development of conceptual and minimal practices of land art, marked sites and axiomatic structures, artists, none of them really sculptors, were beginning to

---

[4] Pictorial Nominalism, p 151

[5] Rosalind Krauss, "Sculpture in the Expanded Field", reprinted in "The Originality of the Avant-garde and other Modernist Myths", Cambridge, MIT Press, 1985, p 277

explore the boundaries of sculpture's negatively defined condition, as Krauss put it, sculpture = not landscape, not architecture.
By problematising negativity they incorporated the positive terms, landscape and architecture into new permutations of practice. Krauss characterised this as a movement out of the purity of modernism into the plurality of postmodernism.

> " For within the situation of postmodernism, practice is not defined in relation to a given medium – sculpture – but rather in relation to a set of cultural terms, for which any medium – photography, books, lines on walls, mirrors, or sculpture itself – might be used."[6]

This condition is epitomised by 'the expanded field' that replaces any literal notion of matter or material. Thus sculpture is not to be essentialised in terms of marble or steel, and impliedly neither could painting be essentialised in terms of paint or flatness. Krauss was able to say sculpture advanced by incorporating 'not-scultpure', that is landscape and architecture. It was this almost perverse combination of sculpture and not-sculpture that defined the important sculptural work of the 1970s. Similarly since that time it has been the almost perverse combination of painting and its opposite, not-painting that has seen the discipline test its own limits, becoming infinitely malleable, to be self differing, and separate off from itself in search of other ways of being itself.
In the 1980s painters once again withdrew from their craft training for the sake of a new kind of practice, initially known as Neo Conceptualism but eventually dubbed installation art. Site specificity was an essential element of installation art since it revealed the physical and political aspects of the place of exhibition. This was contrasted to traditional easel painting which could be hung in any 'white cube' gallery regardless of its geo-political situation. Site specificity was a form of institutional critique that exposed an apparent bias of galleries and museums in favour of portable quietistic works. Site poses the concrete materiality of place against the ephemeral virtuality of the painted image.[7]

[8]

[6] ibid p 288
[7] Ilya Kabakov, The Man Who Flew Into Space From His Apartment, 1968-96

By the early 1990s artists such as Guillaume Bijl, **Ilya Kabakov**, Jannis Kounellis, Wolfgang Laib, Meg Cranston, Jenny Holzer, Damien Hirst, Ange Leccia, Sherrie Levine, Mike Kelley, Cady Noland, **Jessica Stockholder** and Hany Armanious were producing work that was object based, environmental, time based, multimedia, interactive, and participatory. All of these elements, that are not yet a definition of installation art, are posed negatively in relation to the formal aspects of painting, namely static, flat, image based, timeless, silent and a one way form of communication.
Since most of the antecedents of installation art were based on the dialectical tension between the image and object nature of painting, and since most of the practitioners of installation art have been painters facing the impossibility of painting, the term 'installation art' simply functions as a red herring or misnomer.

Installation art, like conceptual art and the readymade, are constructed out of a negative relation with painting, opposing physical form, flatness, pictoriality, with what Krauss terms a "post medium condition"[9] where art is no longer confined by

> "the material properties of a merely physical object like support" [10]

Installation art attains a post medium condition as an inverse logic structured on the ontological absence of painting.
In the current decade artists enter the professional field of painting where 'not painting' is their starting point. Whatever is done from there is determined by relational movements away from painting. Consequently artists who abandon painting for a rainbow alliance of media and skills, ultimately move along the same path, away from concerns for a flat image towards object and time based practices.
In this way expanded painting could just keep expanding and become a kind of total painting, an absorption and "synthesis of all the arts under painting"[11]. This kind of total painting, seems to go beyond our understanding of medium, to require either a new definition of medium or a new discourse around the 'post medium condition'.

φύσις

Certain Greek terms and their etymology are useful in negotiating this situation particularly through the precedent of Martin Heidegger and his writings on aesthetics that I will call a post aesthetics. *Phusis*, the term Heidegger uses quite extensively, is primordial in relation to form, change, presence, coming into being. Quoting Heidegger,

> "The Greeks had grasped under the name *phusis* both the initial appearing of things as well as the basis of all things, the universal support which remains in reserve throughout and beneath all forms …. Thought as the most general trait which embraces and penetrates reality … a cause of all particular things."[12]

By re-interpreting *phusis* in relation to 'original aesthetics', Greek thinking on painting and sculpture, historical differences in ontological paradigms are revealed, particularly the transformation of intelligibility carried out by contemporary art in its 'post medium

---

[8] Jessica Stockholder, Growing Rock Candy Mountain Grasses in Canned Sand; 1992; Installation view, Westfalischer Kunstverein, Munster, Germany; 23 x 12 m piece of violet bathing suit material, sandstone native to Munster, gaseous concrete building blocks, plaster, basket material, electrical wiring, 3 very small lights, newspaper glued to the wall, acrylic paint, metal cables and Styrofoam
[9] Krauss, A Voyage on the North Sea, Thames and Hudson, London, 1999, p 32
[10] ibid, p 27
[11] Steven Melville, "Philosophy Beside Itself: On Deconstruction and Modernism", Minneapolis, Uni of Minnesota Press, 1986, p10
[12] Michel Harr, The Song of the Earth : Heidegger and the Grounds of the History of Being, Bloomington, Indiana University Press, 1993,p 48

condition'. This involves an overcoming of the subjective bias of modern philosophical aesthetics and a return to the material understanding of the work of art itself by way of a 'post aesthetics', something after and beyond aesthetics. Post aesthetics involves taking a future-primitive position on art whereby the material understanding of original aesthetics is used to overcome the subjective bias of modern aesthetics, granting a new understanding of our primary relationship to things and their mode of presence in the world.

If modern aesthetics is a way of feeling presence, of sensing that something is there and that because of my feelings and judgements I am there as well, then art will be validated as a form of affective presence. If I ask: what is art doing if it is not guaranteeing my subjectivity, not pleasing me with beautiful affects, not presenting a literal presence? Heidegger answers with the word, revelation. As he ponders in the Question concerning Technology,

> "could it be that revealing lays claim to the arts most primally?" [13]

What is revealed in art, according to Heidegger, can be discussed in terms of two ontological dimensions, earth and world.

World

World is initially characterised in *Being and Time* as a context of useful items and interpersonal relations, as a starting point for developing a deeper understanding of how human beings are as beings-in-the-world, beings whose world is a matrix of meaningfulness. World is not to be considered a thing or collection of things, it is an all encompassing environment that has two aspects, static and dynamic, where world is both a place and a giver of meaning.

Earth

The other ontologicial dimension of revelation is earth. Earth is not the planet or soil but it includes them. Earth is closer to the idea of nature but in a more original sense. Original in the sense of being new to us and original as going back to ancient origins. Earth is very close to *phusis*, which gives us the modern words, physics and nature. However a more original understanding of *phusis* goes beyond the merely physical and beyond nature as a category of being.

Phusis in its fullness is a bursting forth and a decaying return, an interplay of presence and absence, of showing and concealing,

> "a latent thrust, a subterranean growth, a mute, concealed, nocturnal thickness"[14]

Heidegger takes much of *phusis* into the idea of earth as a way of thinking presence and absence, to glimpse this special binary, so as not to be blinded by the sheer overtness of presence. Heidegger founds a new understanding of the term earth by beginning with nature, taking an etymological journey back to *phusis* and then returning with a dynamic notion of earth that includes nature, an obscure almost impenetrable ground of understanding, a terrestial homeland and finally the material form of the work of art.

Post Aesthetics

When painting breaks its own boundaries it also leaves behind established modes of practice and terms of discourse. It demands a new talk to match its walk, something beyond aesthetics, beyond our usual understanding of subjects and objects, that I have called a 'post aesthetics'.

---

[13] Martin Heidegger, "The Question concerning Technology" in *The Question concerning Technology* Harper, NYC, 1977, p 35

[14] Michel Harr, The Song of the Earth : Heidegger and the Grounds of the History of Being, Bloomington, Indiana University Press, 1993, p 114

The discipline of aesthetics often includes discussions of reality, knowledge, experience and being. If reality is to be defined by a subject who captures a world in their sensual experience then aesthetics provides the language for dealing with it in terms of beauty, taste and pleasure. Ultimately

> "Any object can be experienced aesthetically, no object is inherently unaesthetic."[15]

Thus modern aesthetics is a lens through which all experience is sensed and judged. Every thing, every experience exists on an aesthetic scale. Aesthetics is no longer a theory of art but a model of how an experiencing subject engages with a world and gives it meaning and value.

New disciplines like art theory and cultural theory spring from a desire to overcome this kind of sheer aesthetic mindedness and get closer to cultural constructions and concrete events. In previous ages art had defined a world by setting the limits between people, communities, nature and the Gods. Modern Aesthetics lessened the potentiality of art by reducing it to a private sensory experience. In post aesthetics, subjectivity and beauty are no longer dominant terms since the subjective aestheticisation of experience is shifted in favour of the poetic revelation of material being. Post aesthetics is an aesthetic discourse appropriate to a new kind of work that generates an ontological question about how something is in 'being'.

This 'new work' or painting in a post medium condition is painting interfaced with sculpture, installation, video, performance, new media and so on. It asks what painting is, how it has been historically, what is secondary and what is essential about painting and then proceeds to its limits. While Rosalind Krauss coined the term post medium condition she considers it to be a

> "monstrous myth."[16], and that "the abandonment of the specific medium spells the death of serious art"[17].

In the face of this her current project as outlined as

> "to wrestl(ing) new media to the mat of specificity."[18]

I would like to do a similar kind of wrestling match by looking at an example of recent expanded painting, and consider it in terms of post aesthetics.

Jim Lambie makes his "Zobop" installations by applying brightly coloured vinyl tape in geometric patterns on the floor. In doing so he transforms the neutral zone of the gallery floor into a visually activated space. The tape maps the floor so as to reveal the architectural shaping of space, while at the same time jamming the space by overwriting it with hyperactive linework and maximal sensual intensities. The colour is so strong in brightness and contrast, and the linework so hypnotic in its rhythmic differentiation that it induces a kind of vertigo.

While the work seems to deflect any generic description, the discipline of painting is invoked since the conventions of painting are both present and absent. Painting is conspicuously absent since there is no painted canvas hanging on the wall. Yet the colour of painting is all around us, unexpectedly under our feet, threatening to tip us headlong into an infinite visual sensuousness. The disappearance of painting in its traditional form is

---

[15] Jerome Stolnitz, "The Aeshtetic Attitude" in Carolyn Korsmeyer (Ed), Aesthetics : The Big Questions, Malden, Blackwell, 1998, p 83

[16] Rosalind Krauss, Perpetual Inventory, MIT Press, London, 2010, p xiv

[17] ibid, p xiii

[18] ibid

concealed by the sensationalism of colour itself. Colour is not carried by liquids exuded from a tube and applied by a brush, but by industrially manufactured vinyl strips cut into shape and affixed to the floor.
Lambies “Zobop” series, executed in various venues over several years, are all floor works. Floors are the cultural, architectural extension of the surface of the earth. As we stand on the earth everyday, it withdraws into the background of our awareness, completely taken for granted. It is the ground on which we contemplate the action taking place at a thoughtful level somewhere at eye level.
“Zobop” reveals the floor as the basis of an architectural space that presumes a vertical conceptual orientation. By refusing the verticality of the painted canvas, Lambie liberates colour and almost literally tips it at our feet. By colouring the floor, making it the surface of painting, the floor itself is invited out of its background presence, out of neutrality into an uncanny presence. Unexpectedly the work throws a light on how much work the floor does, how it holds me up, guides me through space, facilitates movement through a world. The artwork reveals that the floor functions by its very withdrawal, by resting outside of everyday awareness.

Ontological Aesthetics

Expanded painting like Lambie’s undoes the framework by which we have understood painting so that another painting can take place. Post aesthetics reconfigures the framework of aesthetics so that a new thinking about art can take place. If aesthetics once provided a method of judging good and bad art, can we ask post aesthetics as a kind of ontological aesthetics to make a judgement about the kind of presence an artwork establishes or reveals? A work of art could be said to be ontologically good if it makes a full disclosure, that is, that there is revealing *and* concealing. So, despite the tendency for presence to overcome absence, absence has been allowed to be, revealing the secret partiality of presence.
A bad ontology results in the injurious neglect of things, the disappearance of things, literally the disappearance of the earth in its fullness. Art does good work when it becomes the practice that maintains things as things, in their uncanny presence, in their pres-absentiality
To talk the ontological aesthetics of expanded painting I have evoked the terms earth and world to indicate the uncanny presence of something that is paradoxically painting and not painting.
If ontological aesthetics gets beyond mere presence and thinks into absence as well, then it will have an entirely different question to ask beyond guaranteeing my subjectivity, pleasing me with beautiful affects, presenting an obvious presence. The task for ontological aesthetics and art in a post medium condition is to reveal ‘what is’ and ‘what matters’ in a contemporary techno-scientific age.

After the Screen: Array Aesthetics and Transmateriality

Mitchell Whitelaw University of Canberra

Glowing Rectangles

For all the diversity of the contemporary media ecology - network, broadcast, games, mobile - one technical form is entirely dominant. Screens are everywhere, at every scale, in every context. As well as the archetypal "big" and "small" screens of cinema and television we are now familiar with pocket- and book-sized screens, public screens as advertising or signage, urban screens at architectural scales. As satirical news site The Onion observes, we "spend the vast majority of each day staring at, interacting with, and deriving satisfaction from glowing rectangles" [1].

Formally and technically these screens vary - in size and aspect ratio, display technology, spatiotemporal limits, and so on. They are united however in two basic attributes, which are something like the contract of the screen. First, the screen operates as a mediating substrate for its content - the screen itself recedes in favor of its hosted image. The screen is self-effacing (though never of course absent or invisible). This tendency is clearly evident in screen design and technology; we prize screens that are slight and bright - those that best make themselves disappear. Apple's "Retina" display technology claims to have passed an important perceptual threshhold of self-effacement, attaining a spatial density so high that individual pixels are indistinguishable to the naked eye [2]. The second key attribute of contemporary digital screens is their tendency to generality. The self-effacing substrate of the screen is increasingly a general-purpose substrate - unlinked to any specific content type; equally capable of displaying anything - text, image, web site, video, or word-processor. This attribute is coupled of course to the generality of networked computing; since the era of multimedia the computer screen has led the way in modeling itself as a container for anything (just as the computer models itself a "machine for anything"). The past decade has simply seen this general-purpose container proliferate across scales and contexts, ushering us into the era of glowing rectangles.

However over the past decade in design and the media arts, a wave of practice has appeared which as this paper will argue, resists the dominance of the glowing rectangle. Given the near-total cultural saturation of the screen, this is unsurprising, given the ongoing cultural dance of fringe and mainstream in which this practice participates. This is not simply a story of resistance however. In proposing and describing two particular strains of "post-screen" practice, this paper aims firstly to outline the shared terms of their relationship with the screen, and in the process develop a more detailed sense of these conceptual devices of generality, outlined above, and its opposite, specificity. Secondly, and more briefly, it outlines a theorisation of this practice, invoking transmateriality, an account of the paradoxical materiality of (especially digital) media, and Gumbrecht's notion of presence.

2. Arrays During the opening ceremony of the 2008 Beijing Olympics, a huge grid of drummers assembled in the stadium, each standing before a large square *fou* drum, a traditional Chinese instrument [3]. Each drum was augmented with white LEDs mounted on its surface, triggered with each drum stroke. The drummers formed a vast array of

discrete audiovisual elements, precisely choreographed in the style of these spectaculars. Human pixels, but coarse and resolutely human; at one point the drummers desynchronised entirely, forming a thunderous grid of flickering light. In a ceremony created for the (broadcast) screen - to the infamous extent of splicing computer-animated fireworks into its telecast in place of real ones - the drummers were a moment of involution. Their array echoed all the other, more conventionally self-effacing screens threaded through the event; but it also inverted some of their key attributes. Firstly its substrate, instead of receding behind "content", came forward; if anything substrate and content were one and the same. Secondly, while this array nods towards the generality of the screen in its choreographed patterns - which like the patterns on a screen could be "anything at all" - it veers strongly in the opposite direction, towards the here and now, what I will call *specificity* [4]. The poetics of this array rely on the specificity of its elements - the drummers, drums, and their solid-state illumination - rather than the patterns that play across it.

The drummers are one popular example of a formal trope we can find throughout media arts and design practice over the past decade. Daniel Rozin's 1999 *Wooden Mirror* is one of the earlier examples [5]. *Wooden Mirror* is an array of square wooden tiles embedded in a large octagonal frame, along with a bundle of custom electronics. The tiles are fitted with servomotors, so that each one can tilt up and down on its horizontal axis. As its angle to the light changes, each tile appears brighter or darker. Rozin wires up the array to a videocamera, to complete the mirror circuit: the brightness of pixels in the incoming image drives the angle of the tiles. Given the overtly visual logic of the work, it's interesting that its sound is equally striking: the wooden tiles clatter like mechanical rainfall, sonifying the rate of change of the image; as the image becomes still, the clatter dies off to a low twitching. Again, this array emphasises the material presence of its substrate. The tonal "generality" of the wooden mirror is functional enough to be familiar, but the coarse mechanical clattering of these pixels makes them inescapably specific.

Rozin has made many similar mirrors; notable is *Trash Mirror* (2001) where the individual elements - irregularly shaped pieces of rubbish - are packed into a freeform mosaic [6]. This array moves one more step away from the homogeneous generality of the digital screen. Here the elements are irregular in size and shape, but also carry their own specific textures and colours. In *Mirrors Mirror* (2008) the regular grid returns, but the array elements are themselved replaced by mirrors; as these tilt they reflect different parts of the environment [7]. Here the location of the tonal "content" in the array is, like the image source, deferred to the environment. In a familiar digital screen, image elements are luminous modules whose colour value is independent and absolute. In Rozin's *Wooden Mirror* that value becomes relative - tonality is based on self-shading, which depends on the lighting of the work. In *Mirrors Mirror* this relativity is multiplied; each element will reflect a different portion of the environment, depending on both its angle and the viewpoint of the observer.

In many cases these media art arrays depart from the two-dimensional grid entirely. Robert Henke and Christopher Bauder's *ATOM* (2007-8) is an eight-by-eight grid of white helium balloons, each one fitted with LED illumination and tethered to a computer-controlled winch [8]. The grid becomes a mobile, configurable light-form, tightly coupled with Henke's electronic soundtrack in live performance. This array lowers its resolution

drastically, and limits its generality in one dimension (monochrome elements), but extends its reach (literally) into a third axis. ART+COM's 2008 kinetic sculpture at the BMW museum uses a similar configuration, but a higher "resolution" - in this case 714 metal spheres are suspended from motorised cables, forming a smoothly undulating matrix - a sort of programmed corporate ballet [9]. *Cloud* (2008), a sculpture in Heathrow airport by London art and design firm Troika, illustrates another permutation: here a 2d array forms the skin of a large three-dimensional sculptural form. In this case the elements are electromagnetic flip-dots - components often used in airport signage before it was overtaken by glowing rectangles [10]. As in Rozin's *Mirrors*, Troika consciously exploit the materiality, gestural character and the sound of these retro-pixels. rAndom International's 2010 *Swarm Light* demonstrates a "saturated" 3d array [11]. The work consists of three cubic arrays of white LED lights, each ten elements per side; these cubic volumes host a flowing, flickering "swarm" of sound-responsive agents which traverse the space, brightening or dimming the array as they move.

The work of British designers United Visual Artists offers a useful longitudinal study in post-screen imaging; in particular their work addresses one of the central technical players in this field, LED lighting. UVA's first project involved a huge LED array that formed the stage set of Massive Attack's 100th Window tour [12]. Unlike more screenful video backdrops, this low-res grid had an inescapable presence, hung directly behind the band and looming over the stage. Rather than an image machine, UVA treat the grid as a luminous dot-matrix for the twitching alphanumeric characters of real-time data. In subsequent work UVA develop this approach in a number of directions, but digitally articulated light - enabled by the LED - is a recurring theme. In *Monolith* (2006) UVA use a pair of large, full-colour LED screens, but treat them as a dynamic light source rather than a substrate for images; subtle gradients and washes of colour spill over the audience and into the installation environment, coupled with generated sound [13]. In *Volume* (2006), another installation piece, the array elements are long vertical LED strips, again treated as generators of pattern, colour and sound; the work forms an interactive field as each element responds to nearby activity [14]. In the context of this steady dismemberment of the screen, UVA's latest work *The Speed of Light* is notable in that it leaves LED arrays aside entirely [15]. Instead it uses installed lasers manipulated into dynamic, walk-in calligraphy, as if light had been finally prised away from its digital substrate, and turned loose in the environment.

Beyond their formal similarities, these arrays share some core approaches and contexts which provide a coherent portrait of a sort of post-screen practice. These works adopt one key feature of the screen - the "generality" of an articulated substrate - but trade it off to varying extents for more "specificity" - exploiting the local, particular materiality of the work and its environment. This specificity is also technological, reflecting a practice that crafts hard- and software into idiosyncratic configurations, rather than using off-the-shelf infrastructure. Light is a strong theme, in particular the solid-state, digitally addressable light of the LED (essentially a free-floating pixel). However the optical in these arrays is always tightly coupled with other modalities, especially sound, which is either a cherished byproduct of the array mechanism (as in Rozin's *Mirrors* and Troika's *Cloud*) or generated by the array elements themselves (as in the drummers and UVA's *Volume*). A quality of liveness is linked with the turn to specificity and being-in-the-environment; from the "live data" of UVA's Massive Attack show, to the live interaction and generation of their later

installations, to the live video driving Rozin's *Mirrors*. Performance and temporary installation are the dominant forms here - emphasising the intensified moment, rather than the any-time of static content.

3. Projection Mapping and Extruded Light

In one sense these arrays present a disintegration of the screen - they pull its elements apart and embed them in the environment. In another strain of media arts practice, something like the converse occurs, though with what I will argue are similar interests and agendas. In this approach screen-like technologies are used intact, rather than decomposed; but their function and their relationship to the environment is transformed. These works reverse-engineer the digital image, exploiting its digital (general) malleability in order to fit it to a specific environment.

The work of Norwegian artist HC Gilje illustrates one trajectory of this second post-screen approach. Gilje's work from the late 90s was in live digital video, with his ensemble 242.pilots. This practice was linked to the burgeoning activity in experimental electronic music at the time; here again, performance, improvisation and the intensified moment - what Gilje calls an "extended now" - are central concerns, though the work is strongly screen-focused in its results [16]. In Gilje's work over the following decade, he demonstrates another path towards the post-screen. Gilje's *nodio* (2005-) is a custom software system for distributing video content across collections of linked "nodes" [17]. In *drifter* (2006) these nodes are manifest as a ring of twelve screens which form a linked audiovisual interspace [18]. With *dense* (2007) these nodes take on a more sculptural presence - hanging strips of fabric illuminated from both sides with a tailored video-projection [19]. Here Gilje adapts the screen technology of the video projector to a sculptural environment, pushing it one step away from image and towards illumination. The work also depends on a specific material surface - the translucent weave of the fabric enables the double-sided layering of pattern.

shift (2008) develops this approach: a technique known as projection mapping, in which the projected image is reverse-engineered to fit a specific surface [20]. In *shift* Gilje's nodes are simple rectangular boxes, constructed from plywood. Using more custom software, the artist illuminates a cluster of these boxes with precisely mapped projected images. The coupled sound emanates from speakers housed in each box, so the objects are again audiovisual (and acoustically distinct) nodes; Gilje composes material for this environment in search of what he terms "audiovisual powerchords" - moments of intense juxtaposition and interplay [17]. In *blink* (2009) Gilje dispenses with the boxes, instead treating the bare installation space. Simple, geometric elements - angular lines and bands of tone and colour - are reflected and modulated by the space itself, diffusing from irregular polished floorboards and painted walls [21]. The work plays the room with articulated light, carefully matched to its geometry in way that heightens our awareness of the interplay of space, light and materials.

Projection mapping has recently flourished in "visualist" practice across art, design and performance contexts; trompe-l'oeil architectural facades are one popular genre, manipulating the built environment by rendering it with a tailored skin of articulated light (see for example Urbanscreen's *Kubik 555* [22]). German designers Grosse 8 and Lichtfront demonstrate a logical extension of the technique, using multiple projectors to

create an "augmented sculpture" in the round [23]. Another notable example is *Scintillation* (2009) by Xavier Chassaing, a digital stop-motion film in which projection mapping is used to layer a domestic environment with luminous swirls of particles, igniting the petals of an orchid and tracing the curves of a moulded plaster cornice [24]. As in Gilje's *blink*, *Scintillation* emphasises the ambience of the projected light - reflections and diffusions are heightened by hand-held macro cinematography, artfully producing an impression of material texture. But in the process it raises some interesting problems for our analytical premise - a shift from the screenful image to something more live and specific. For *Scintillation* is absolutely a work of filmmaking; here projection mapping - the tailored materialisation of the image - is deployed as a technique for producing generalisable, substrate-independent image content.

The final example in this survey addresses the same tension. In their recent short film *Making Future Magic*, London design agency Berg give an ingenious demonstration of both the material turn of post-screen imaging, and its recuperation as image content [25]. Berg developed an animation technique combining multiple-exposure stop-motion with a hand-held source of articulated light - specifically the glowing rectangle of the moment, Apple's iPad. 3d forms are digitally modelled and animated, then decomposed into sequences of 2d slices. These slices are then replayed into the environment, and thus recomposed into 3d forms, by moving an iPad screen over successive still frame exposures. As Berg term it, this is "extruded light" - as in UVA's latest work, it's as if light itself has been unpinned from its substrate. The results are a beguiling combination of loose, organic light painting with simple 3d geometry and DSLR imaging. As Berg frame the work, it fits entirely within the post-screen turn proposed here. Responding to a brief around "a magical version of future media", Berg are "exploring how surfaces and screens look and work in the world ... finding playful uses for the increasingly ubiquitous ‘glowing rectangles’ ..." [25]. Again the material embeddedness of this articulated light is emphasised - the way it reflects from puddles and diffuses through foliage. Screen as object in the world, rather than window to somewhere else. As in *Scintillation* however the inescapable irony is that the outcomes of this work are entirely bound up with screenful images - with the generalising infrastructures and distribution pipelines of social image sharing, print-on-demand and networked video.

4. Transmateriality and Presence Culture

To recap briefly: the ubiquitous digital screen is characterised by both generality - an ability to display any content at all - and self-effacing slightness - it tries to make itself disappear as a neutral substrate for content. In contrast to these tendencies this paper describes two distinct but parallel strains of "post-screen" practice in the media arts and design. Arrays mimic the grid configuration of the screen, but lower its resolution and emphasise the material presence of the array elements - their local and individual specificity is balanced with their malleable generality (their ability to carry anything-at-all). Projection mapping and "extruded light" practices also emphasise specificity, materiality and a local, performative being-in-the-world, but they do so by different means - exploiting the malleability of the digital screen (and the computational representations it hosts) in order to make it intensely site-specific. To the extent that they both adapt and resist the attributes of our familiar glowing rectangles, we could describe these practices as post-screen, but this "post" is nothing like a conscious critique, let alone a revolutionary break. However hard they may pull towards specificity and local materiality, they are readily - by design or necessity -

recaptured as screen fodder.

Both these post-screen tendencies and their screenful recuperation can be usefully framed through the notion of transmateriality, a concept that attempts to capture a fundamental duality in digital (and other) media: they are everywhere and always material, yet often function as if they are immaterial [26]. In a transmaterial view media always operate as local material instances (this is their aspect of *specificity*) yet retain the ability to hold specificity at bay - resisting the contingencies of flux - to create a functional *generalisation* in which this pixel is the same as that one, the email I send is the same as the one you receive, and one node on the network is much the same as any other.

In the glowing rectangle paradigm functional generality is entirely dominant. The work considered here, on the other hand, revels more in the pleasures and practices of specificity - the clatter of servo-actuated wood or the play of light on this particular wall. In their push towards liveness (of interaction or data), performativity, their integration of sound, and their emphasis on evanescent materiality, these works evoke what Hans Ulrich Gumbrecht would call "presence culture" - that mode of apprehending the world which is characterised by fleeting but intense moments of being, and a sense of being part of the world of things, rather than outside it, looking in [27]. Gumbrecht constructs presence in opposition to a dominant "meaning culture", in which the essence of material things can be obtained only through interpretation. Gumbrecht describes the relationship between these poles as one of dynamic oscillation. "Presence phenomena" become "effects of" presence, "because we can only encounter them within a culture that is predominantly a meaning culture. ... [T]hey are necessarily surrounded by, wrapped into, and perhaps even mediated by clouds and cushions of meaning" [27].

In exactly the same way we find an inevitable oscillation here between screen and post-screen. We can align the screen with generality and meaning culture, and the post-screen with specificity and presence culture; but here too the post-screen is evanescent and elusive, instead existing largely within the dominant screen culture. However this is not to discount the utopian aspirations of a post-screen practice, which might instead be located through the perspective of transmateriality. For in echoing the screen, or in literally bending it to the local, present and specific, these works operate as reminders of the ubiquitous and everyday materiality of our media, of the fact that depite appearances, every glowing rectangle is already local and specific. If that specificity is latent, then these works demonstrate practical strategies for making it explicit; from hardware hacking to modular LEDs and custom software, they participate in what I have termed "expanded computing" [28], using the malleability of digital media to reactivate its presence - and thus our presence, too - in the world of things.

References

1. ‘Report: 90% Of Waking Hours Spent Staring At Glowing Rectangles’, *The Onion*, 2009 <http://www.theonion.com/articles/report-90-of-waking-hours-spent-staring-at-glowing,2747/> [accessed 27 September 2010].

2. Apple Computer, ‘iPhone 4 - Learn about the high-resolution Retina display’, 2010 <http://www.apple.com/iphone/features/retina-display.html> [accessed 5 October 2010].

3. See for example *BEIJING OLYMPIC GAMES OPENING CEREMONY 2008*, 2008 <http://www.youtube.com/watch?v=JsDY1Ha83M8&feature=youtube_gdata_player> [accessed 5 October 2010].

4. See Whitelaw, Mitchell, ‘Right Here, Right Now: On HC Gilje's Networks of Specificity’, in *Retrospective Catalogue 2009*, ed. by Anne Szefer Karlsen (Hordaland Art Centre, 2010), pp. 82-84 <http://teemingvoid.blogspot.com/2009/10/right-here-right-now-hc-giljes-networks.html> [accessed 5 October 2010].

5. Rozin, Daniel, ‘Wooden Mirror’, 1999 <http://www.smoothware.com/danny/woodenmirror.html> [accessed 26 May 2009].

6. Rozin, Daniel, ‘Trash Mirror’, 2001 <http://www.smoothware.com/danny/newtrashmirror.html> [accessed 5 October 2010].

7. Rozin, Daniel, ‘Mirrors Mirror’, 2008 <http://www.smoothware.com/danny/mirrorsmirror.html> [accessed 5 October 2010].

8. Henke, Robert, and Christopher Bauder, ‘ATOM’, 2007 <http://www.monolake.de/concerts/atom.html> [accessed 1 June 2009].

9. ART + COM, ‘Kinetic Sculpture BMW Museum’, 2008 <http://www.artcom.de/index.php?option=com_acprojects&page=6&id=62&Itemid=115&details=0&lang=en> [accessed 1 June 2009].

10. Troika, ‘CLOUD’, 2008 <http://troika.uk.com/cloud> [accessed 26 May 2009].

11. rAndom International, *'Swarm Light' by rAndom International / Design Miami / Art Basel 2010*, 2010 <http://vimeo.com/12525044> [accessed 5 October 2010].

12. United Visual Artists, ‘Massive Attack 2003’, 2002 <http://www.uva.co.uk/archives/4> [accessed 5 October 2010].

13. United Visual Artists, ‘Monolith’, 2006 <http://www.uva.co.uk/archives/31> [accessed 5 October 2010].

14. United Visual Artists, ‘Volume at the V&A’, 2006 <http://www.uva.co.uk/archives/49> [accessed 5 October 2010].

15. United Visual Artists, ‘Speed of Light’, 2010 <http://www.uva.co.uk/archives/126>

[accessed 5 October 2010].

16. Gilje, HC, 'Within the space of an instant', in *Get Real: Real-Time + Art + Theory + Practice + History*, ed. by Morten Søndegaard, Pap/DVD (George Braziller, 2005) <http://www.bek.no/~hc/text_html/getreal_txt.htm> [accessed 5 October 2010].

17. Gilje, HC, 'nodio 1st generation', *Conversations with spaces*, 2007 <http://hcgilje.wordpress.com/2007/04/29/nodio-1st-generation/> [accessed 5 October 2010].

18. Gilje, HC, 'drifter, installation 2006', *Conversations with spaces*, 2007 <http://hcgilje.wordpress.com/2007/04/29/drifter/> [accessed 5 October 2010].

19. Gilje, HC, 'Dense, installation 2006', *Conversations with spaces*, 2007 <http://hcgilje.wordpress.com/2007/04/29/dense/> [accessed 5 October 2010].

20. Gilje, HC, 'shift v2: relief projection installation « Conversations with spaces', *Conversations with spaces*, 2008 <http://hcgilje.wordpress.com/2008/10/31/shift-v2-relief-projection-installation/> [accessed 5 October 2010].

21. Gilje, HC, *blink* (Hordaland Kunstsenter, Norway, 2009) <http://vimeo.com/7066012> [accessed 5 October 2010].

22. Urbanscreen, '555 KUBIK', 2009 <http://www.urbanscreen.com/usc/41> [accessed 5 October 2010].

23. Lichtfront, and Grosse 8, *Augmented Sculpture*, 2010 <http://vimeo.com/9697015> [accessed 5 October 2010].

24. Chassaing, Xavier, *Scintillation*, 2009 <http://vimeo.com/3114617> [accessed 5 October 2010].

25. Berg, 'Making Future Magic: light painting with the iPad', 2010 <http://berglondon.com/blog/2010/09/14/magic-ipad-light-painting/> [accessed 5 October 2010].

26. See Whitelaw, Mitchell, 'Notes on Transmateriality', *(the teeming void)*, 2008 <http://teemingvoid.blogspot.com/2008/03/notes-on-transmateriality.html> [accessed 5 October 2010].

27. Gumbrecht, Hans, *Production of Presence: What Meaning Cannot Convey*, 1st edn (Stanford University Press, 2003), 105-106.

28. Whitelaw, Mitchell, 'Transduction, Transmateriality, and Expanded Computing', *(the teeming void)*, 2009 <http://teemingvoid.blogspot.com/2009/01/transduction-transmateriality-and.html> [accessed 5 October 2010].