

**Alan Dunning**

**DOPPELGANGER: A TECHNOLOGICAL GHOST**



**Abstract:**

This paper explores some issues arising out of an artwork investigating how images are constructed in media spaces, Using the model of the Doppelganger – a tangible double or look-a-like - new forms, looking or sounding like someone or something, but having no index in the real world, are constructed by a machine in response to incomplete data.

The paper speculates about the development of a technological ghost evolved purely from a machine. Doppelganger uses interleaved image sources to create a copy of an original made up of entirely machine imagined data. The fields of a video source are separated and interpolated. The resulting images are interpolated again, but this time only using the initial interpolated data as the foundation on which to build a new interpolation. This is repeated until new forms begin to emerge - looking like vaguely the original but composed of entirely new material.

**Topic: Art**

**Alan Dunning**  
Media Arts + Digital  
Technologies  
Alberta College of Art  
+ Design, Canada  
[www.acad.ca](http://www.acad.ca)

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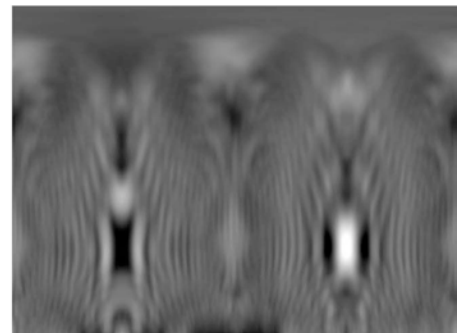
University of Calgary,  
Department of Art,  
Canada  
[www.ucalgary.ca](http://www.ucalgary.ca)

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What the original images and the interpolations have in common are approximates: shape, pose, mass, dimension, though even this disappears if the process is allowed to continue unchecked. What they have lost is an indexical connection to an original. Created from imagined indexical information through reiterated interpolative algorithms, these are not bad copies, nor simply copies of copies, but new forms that emerge out of autonomous and contingent entropic zones.

**References:**

<http://people.ucalgary.ca/~einbrain/new/doppelganger/doppelganger.html>



*Screen Capture: Doppelganger, 2012*

**Contact:**  
[alan.dunning@acad.ca](mailto:alan.dunning@acad.ca)

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## DOPPELGANGER: A TECHNOLOGICAL GHOST

**Alan Dunning**

*Media Arts + Digital Technologies, Alberta College of Art + Design, Calgary, Canada*

*Art Department, University of Calgary, Calgary, Canada*

*www.bodydegreezero.org*

*e-mail: einsteins-brain-project@shaw.ca*

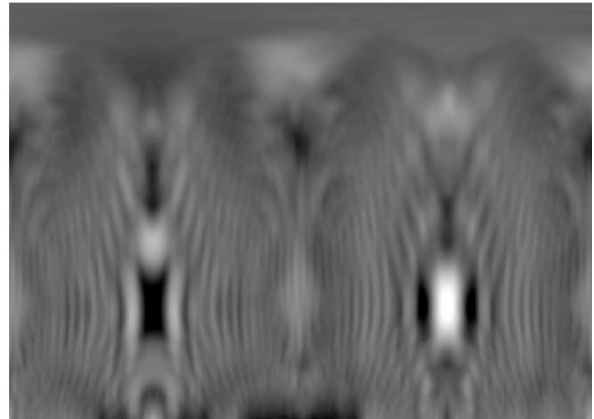
**Paul Woodrow**

*Art Department, University of Calgary, Calgary, Canada*

*www.bodydegreezero.org*

*e-mail: ebp@shaw.ca*

### Premise



*Screen Capture: Doppelganger, 2012*

This paper explores some issues arising out of an artwork investigating how images are constructed in media spaces, Using the model of the Doppelganger – a tangible double or look-a-like - new forms, looking or sounding like someone or something, but having no index in the real world, are constructed by a machine in response to imagined data, input continuously via a feedback loop.

The paper speculates about the development of an unpredicted technological ghost evolved purely from an increasingly autonomous machine. Doppelganger uses interleaved image sources to create a copy of an original made up of entirely machine imagined data. The fields of a video source are separated and interpolated. The resulting images are interpolated again, but this time only using the initial interpolated data as the foundation on which to build a new interpolation. This is repeated until new forms begin to emerge - looking like vaguely the original but composed of entirely new material.

## Generations

Doppelganger uses the decisions of a machine's internal workings. It has conceptual connections to the long tradition of chance mechanisms used to develop art forms that can be seen in the widely known work of Duchamp, Cage and many others, but in the end it is less to do with chance than with the unpredictable, deterministic chaos that can be seen in the early video experiments of Steina and Woody Vasulka and their use of analog video feedback. [1]

The unpredictable images generated in Doppelganger are determined by their initial input and an initial set of instructions. No external, no random elements are involved in their generation. They are produced through simple interpolation rules. A simple max/msp patch continually sorts the image into two new images comprised of odd and even fields and interpolates the missing field of each to produce two full images with both fields present. Using linear interpolation the missing pixels are reconstructed by averaging the pixels directly above and below, and uses the average of the previous and future frame lines for deinterlacing. The process establishes a positive feedback loop in which a preceding decision affects a future re-iterated decision. A simple averaging results in unpredictable images that emerge over time, through massive reiteration. Tiny decisions grow to control the system, invisible micro-events amplified to visibility. The machine becomes an autonomous generator of images, of art forms, through processes initiated by, but progressively more distant from, a human impulse. In the end (40,000 iterations and counting) the resulting images are spawned by what must be considered, even as they are still driven by an initial set of instructions, emergent/generative processes almost entirely detached from their beginnings.

The worlds of Western literature, art, myth and religion can furnish us with many examples where the notion of the unitary self has been put into question, where singularity has been superseded by the double, by anonymity and by the hetronymous. Occurrences of these types are related to questions of reality versus appearance, identity, origin, authenticity and social catastrophe. The most recent crisis has been brought about by the technologies of the computer and the proliferation of the digital that has radically transformed ideas of who we are, and more importantly, who we are to become. Digital technology and its *show thyself* [2] transformational space has made commonplace to take on other identities, to invent avatars, to lead fantasy lives, to become a fiction, and to live in other worlds, suggesting that identity and the worlds which we inhabit are fluid atemporal and aphysical constructions:

*...digital virtuality has seemed bent upon enlarging the gaps that separate its times and spaces from the coordinates of the material world, coordinates that need bodies to have experience...Yet what is nevertheless forming across all kinds of virtual environments, those where time compacts and space intensively unfolds, is the production of a new kind of embodiment. [3]*

The new kind of embodiment requires different models of self, which take into consideration the unfolding of time and space and ones that are attuned to a mode of

active perception.

Writing in 1965, Donna Haraway challenged the prevalent notions of machine/organism interaction. ... *we are all chimeras, theorized and fabricated hybrids of machine and organism, in short we are cyborgs.* [4] Her vision is as important now as it was then as we move much closer to a Cyborgian world.

Neurologist Antonio Damasio described identity as a moment to moment construction, a transient entity, incessantly reconfigured for each and every object with which the brain interacts. The notion of what constitutes consciousness is vital to such a position:

*Our traditional notion of self, however, is linked to the idea of identity and corresponds to a non-transcient collection of unique facts and ways which characterize a person. My term for that entity is the autobiographical self.* [5]

We can see that the autobiographical self is a useful economic and practical social tool, but at the same time it doesn't really account for the complex perceptual processes that go on in the brain and body in the construction of the world which we inhabit. In a sense the autobiographical self impedes, hides and desensitizes our own creative actions and desires.

Parallel with the expanding and developing technologies of communication and representation in scientific research and artistic production, the notion of identity has undergone a transformation. In the past, the notion of self has been directly linked to the physical limits of the body constituting a more or less objective and stable make up. Presently this locative conception of the body has been extended to include all places where electricity can power and spawn communication devices and systems. It is common now to speak of the body as distributed and the mind as extended.

Felix Guattari writes:

*...the machine's environment forms part of machinic agencements. The liminal element of the entry into the machinic zone undergoes a kind of smoothing process, of the uniformisation of a material, like steel which is treated, deterritorialized and made uniform in order to be moulded into machinic shapes. The essence of the machine is linked to procedures which deterritorialize its elements, functions and relations of alterity. Hence it will be necessary to speak of the ontogeny of the technical machine as that which makes it open itself to the exterior.* [6]

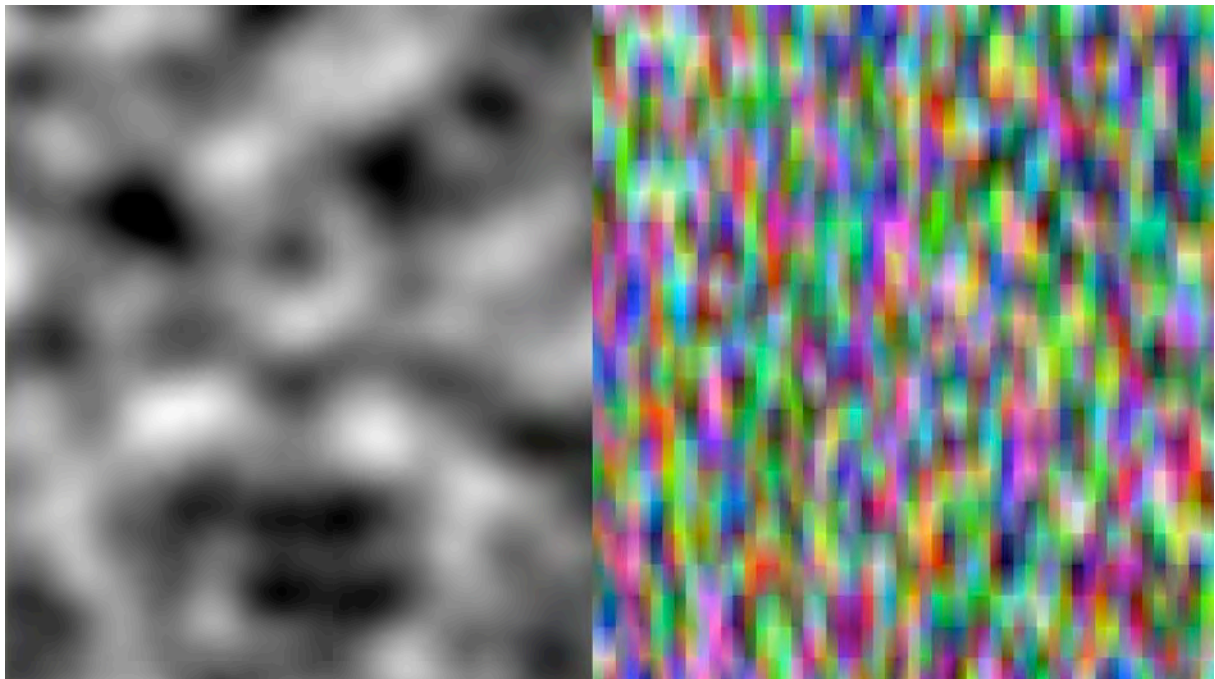
Thomas Metzinger's approach which bridges both sciences and humanities appears to be quite radical in comparison to the accepted and conventional notions of identity. He begins with the premise that selves do not and have never existed in the world. The idea that we have a self is an illusion. What does exist however are ...*phenomenal selves as they appear in conscious experience. ...the phenomenal self is not a thing but an ongoing process: it is the content of a transparent self-model.* [7]

Using Damassio's idea of identity as a moment-to-moment construction, Metzinger's notions of the phenomenal self, and Guattari's grasp that the technical object cannot be limited to its materiality, the work of the Einstein's Brain Project suggest that the world is increasingly populated by entities that are manifestations of the energy flows of a new electro-biotechnical space, spawned from the perturbations of bodies in motion. Set free from the constraints of time and space, from the territorialization of both mind and matter, these are considered as atemporal and aspatial beings existing in a nether world at the intersection of material and being.

Electro-technical reproduction has changed the nature of images that occupy new media spaces. Moving from pareidolic imagining towards a new symbiosis between man and machine in which the pareidolic act is modified and amplified by the interpolative acts of a machine, images are detached from matter, increasingly non-indexical, and, significantly, auto-indexical. The processes involved recall the difficulties contained within the Bootstrap Paradox, in which objects can exist even though they have never been created. This time travel paradox describes a situation in which information or an object is sent back in time, it is recovered in the present and becomes the very object/information that was initially brought back in time in the first place.

This echoes what Brian Winston has called technologies of seeing:

*Digitalization destroys the photographic image as evidence of anything except the process of digitalization. The physicality of the plastic material represented in any photographic image can no longer be guaranteed. For documentary to survive the widespread diffusion of such technology depends on removing its claim on the real. There is no alternative. [8]*



*Ghosts in the Machine 2009*

In *Doppelganger*, *Medium* and *ColourBlind* what was once, as shown in earlier works like *Sound of Silence* (2008) and *Ghosts in the Machine* (2009) the act of pattern and gestalt, might now be act of pure hallucination, Detached from reality, built not from material presence but from the internal processes of a machine/human interpretative system, it suggests that not only has there has been a seminal transformation of the image, but a profound physiological change in how we see.

Some years ago the project imagined a series of bodies in an attempt to identify presences that inhabited the energy fields that we engineered. Briefly these were: the Conscious Body (a body linked to consciousness, the awareness of both the external and internal functioning that can be felt, sensed, and expressed through non-verbal feelings), the Absent Body (a virtual body that must be consciously and repeatedly reanimated to maintain its purchase in a virtual world), the Active Body (a point in space from which emanates events and forces that ripple through and alter the immediate and distant environment), the Mnemonic Body (a repository for memory and events), and the Amplified Body (the body projected into the world, as the processes of the body are made visible and audible).

What at the time seemed all too fanciful and insubstantial now seems too physical, too lodged in earlier conceptions of matter, and need be replaced by conceptual entities even less rooted in the physical world, and even more situated within the electro-biotechnical medium that is deterritorialized matter.

This medium contains only flows and charges. Positive and negative moments that cause undifferentiated matter to move to new locations, and potentially form pattern. Always in flux, the medium pulses into new arrangements faster or slower than can be perceived. The electro-biotechnical medium cannot contain either fixed or indexical moments. Given this what kinds of entities can possibly exist within the medium?

In deciding which entities count as selves, one could look at how entities develop characteristic traits, dispositions and personalities. In a classical physical world this is relatively clear. I am not (normally) you, unless the context allows it; this object is not interchangeable, or even merely confused with that object. In the electro-biotechnical medium characteristics are less certain and less fixed. Microsecond changes in fields, flows and charges account for a medium that is in constant movement, to the extent that all appears over time to be undifferentiated. What might be determined at the millisecond level is no longer visible at the speeds that humans perceive and process data. How then to proceed if entities are imperceptible, lying below our perceptual threshold as micro-durational states and processes? The act of perception itself provides a path.

The Project's most recent environments are exaggerated to the limits of emptiness. In these, fields of undifferentiated colour, of repetitive processes so minutely incremental, or so slow, or conversely so rapid that moment-to-moment activity is rarely seen, it is only after many hours that any signs of activity emerge.

In this electro-biotechnical medium matter is entirely dispersed and deterritorialized,

change in any entropic balance is detected as marks, or clusters of activity, or anything that is noticeable in an otherwise unbroken field. In the works *Doppelganger* (2011 -), *Medium* (2011 -) and *ColourBlind* (2010), it is the slow revision of data, or perhaps even the excitation of data, the evidence of self, that reveals pattern and form.

*Doppelganger* uses interleaved image sources to create a copy of an original made up of entirely machine imagined data. The fields of a video source are separated and interpolated. The resulting images are interpolated again, but this time only using the initial interpolated data as the foundation on which to build a new interpolation. This is repeated until new forms begin to emerge - looking like vaguely the original but composed of entirely new material.

Initially, looking like degraded images of dolls or action figures, or twins or Jeckylls and Hydes, or merely sadder or happier version of themselves the duplicates are built on the digital DNA of the original, but have moved away from a stable state, reinvented by machinic algorithmic dreaming to take on a life of their own. In this work, as in all machinic representation, the tasks of interpretation are left to a machine using a precedent of an existing state to predict a future, but in doing so creates only temporary entropic zones, suggesting that there are unseen, unstable, allopoetic representations within the medium itself.



*Doppelganger, 2012*

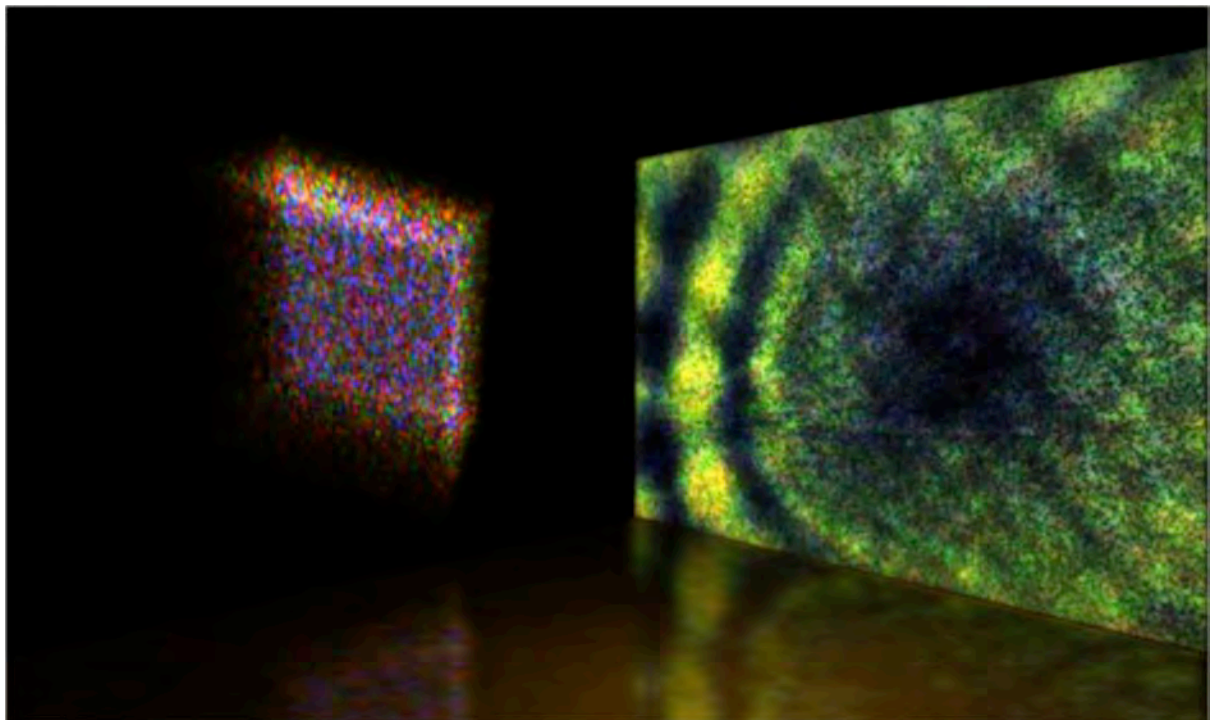
What the original images and the interpolations have in common are approximates: shape, pose, mass, dimension - though even this disappears if the process is allowed to continue unchecked. What they have lost is an indexical connection to an original. However, the very thing lost through an absent index is regained in a new

presence that is the result of the detachment from its original source. New forms emerge precisely because they become auto-indexical. Created from imagined indexical information through reiterated interpolative algorithms, these are not bad copies, nor simply copies of copies, but new forms that emerge out of autonomous and contingent entropic zones.

In *Doppelganger*, images appear initially familiar, yet their appearance becomes increasingly novel due to the instability, (this thing now, that thing later), and continual transformation, that is the result of their flight from the indexical. It is a world constructed on an aesthetic of disappearance.

In both *Colourblind* (2011) and *Medium* (2011) the original source is removed and the building blocks are the stuff of the electro-biotechnical medium itself. In both these works the only source material is an undifferentiated field of colour.

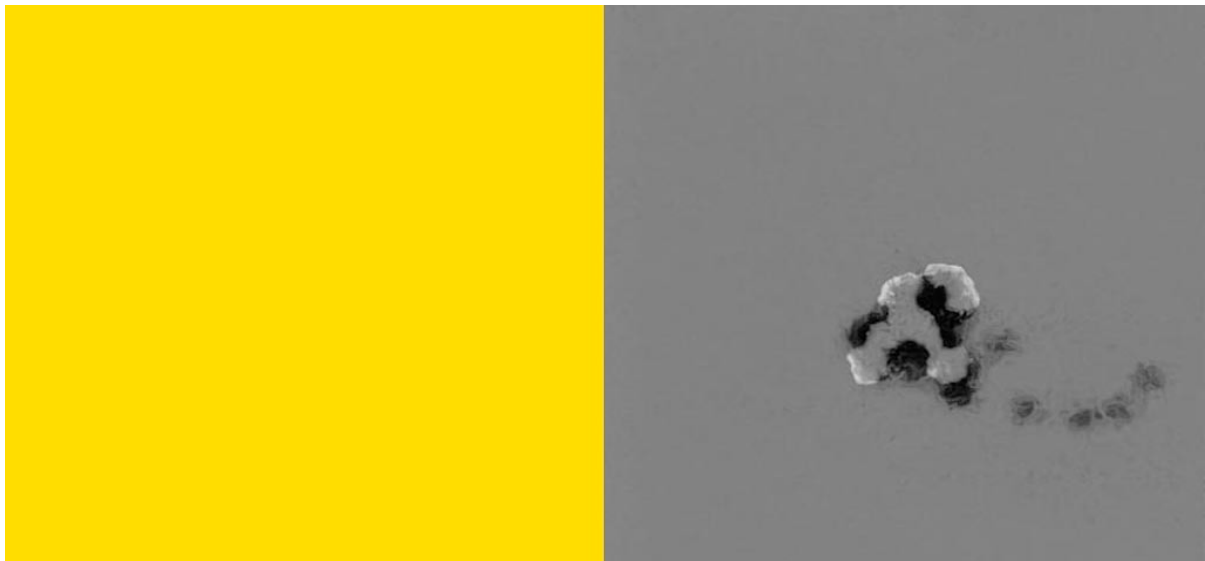
In *ColourBlind*, a camera is turned on, covered with a modified Ganzfeld goggle<sup>9</sup>, and bathed in a pure yellow light. The video stream is sent to a computer where the input is cropped and adjusted for fall-off at the edges of the camera so that the monochrome colour field is undifferentiated by tone or hue. The camera image is processed to construct a voxel volume that is analysed for optical features within a specified region of interest. Tiny inconsistencies in the colour field, invisible to the human eye, are tracked. These inconsistencies are amplified and rendered as pixels on a video plane that becomes increasingly densely populated through additive blending. Over time patterns gradually emerge as the analyses are accumulated and multiplied together. What starts as undifferentiated colour gradually resolves itself into patterns with structure and form.



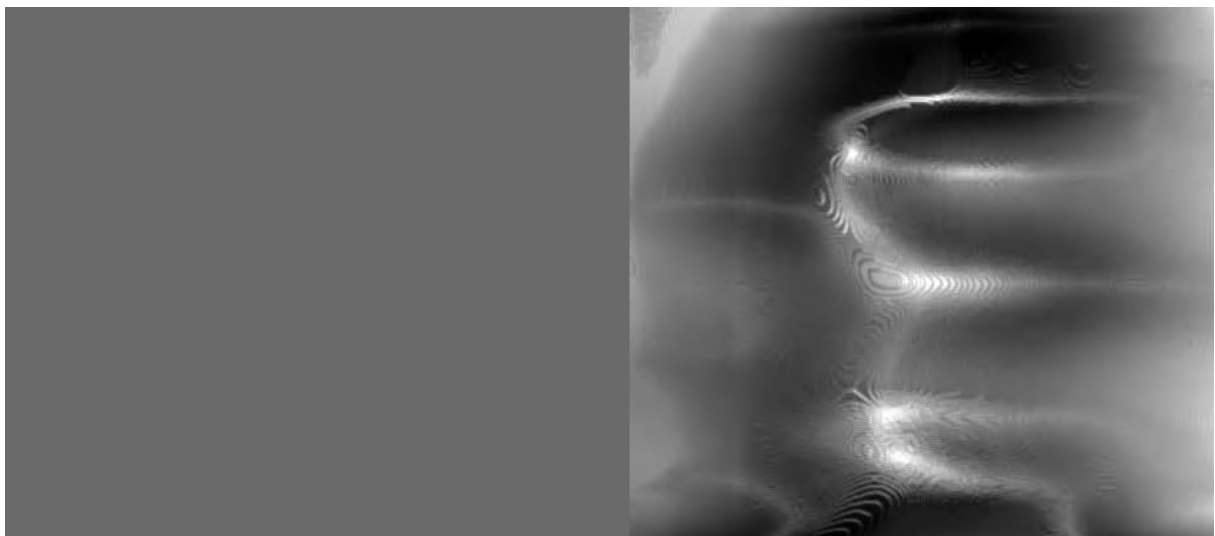
*ColourBlind, 2011*



*Medium* takes this one stage further. A 120Hz colour field is generated by a computer, and is monitored for any changes in the pixel field. Removed from any optical input the field is stable and mathematically consistent from one frame to the next. Over hundreds of hours tiny inconsistencies in the field begin to emerge. As time passes these begin to change, growing or shrinking, developing momentary lives as active regions. The speed at which these form is extremely slow, and the attempt to track the emergence of these has resulted in little or nothing, and while perhaps this is an issue of insufficiently detecting thresholds of activity at such slow rates of change, it is tempting to speculate that it is the very act of observation that excites the electro-biotechnical field, and until there is an active observation the field remains perfect - empty and unchanged – that its manifestation is linked to a different consciousness, a different set of perceptual apparatus.



*Medium, 2011*



*Medium, 2012*

In seeing identity as a process rather than an object existing independently from other objects and selves, and suggesting that this process involves the perception of an observer who, through the act of perception becomes the initiator, Doppelganger, Medium and ColourBlind appear to mimic the processes of identity formation whilst at the same time suggesting there are unconscious experiences and liaisons with machines that are changing and transforming ourselves on a daily basis. In other words, we are not always aware of the processes and content of this ‘transparent self-model’. Identity is as much a product of the autonomic systems of the body interacting with technology that at the same time hides the intrinsic complexity of its own autonomic systems.[10]

The Project’s recent works have at their core the notion that machine generated images are not now only fictional, but largely, and increasingly, hallucinatory. Built on a radically changing system of image production and reception what in the past can be seen as a consequence of the pareidolic impulse, is now complicated by the result of a symbiotic relationship between the deterritorialization of matter, the distributed mind and the resulting electro-biotechnical medium.

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- 9 This mimics the Ganzfeld (complete or open field) effect - a phenomenon of visual perception caused by staring at an undifferentiated and uniform monochrome field of colour. Early investigations into gestalt theory, established that when subjects gazed into a featureless colour field they were unable to see anything after even a few seconds. In further experiments subjects that were immersed in the monochrome field for extended periods of time consistently hallucinated.
- 10 [www.research.ibm.com/autonomic/](http://www.research.ibm.com/autonomic/)