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Revisiting the future

by

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This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to and quotation in this dissertation from the work, or works, of other people has been attributed and has been cited and referenced.

Signature: Date:

Abstract

Revisiting the Future re-examines some ideas of the Italian Futurist painters Boccioni, Balla, Carrà, Russolo and Severini. These ideas included multiplied sensations and states of mind, interpenetration and superimposition, lines of force, and placing the spectator at the center of the painting. These ideas are then examined in relation to the senses and to contemporary art practice. I present ideas on how images for the various senses can operate both individually and collectively to create interactive, multi-sensory communication surfaces. The works I produced are my response to the challenges posed to painting and artistic practice by the sensorium and the Futurist painters' ideas.

University of Cape Town

Contents

Acknowledgements ..... *i*

List of illustrations ..... *ii*

1. PRONUNCIAMENTO *1*

2. FUTURISMO *4*

Simultaneity and states of mind *6*

Multiplied sensation *9*

Dynamism (Lines of force and dynamic sensation) *11*

The affective body – the spectator in the centre of the picture *13*

Progression towards pure abstraction *14*

Complexity, Controversy, Contradiction *16*

3. IDÉE SENSORIALI *19*

Visual images *22*

Aural (sonic) images *25*

Haptic images *27*

Olfactory images *29*

Images of the lesser known senses *30*

Synæsthetic images *31*

Immersive images and the body *32*

Towards the sensorium *35*

4. RITRATTI *36*

Constraints *37*

Ritratto di Balla *39*

Ritratto di Boccioni *42*

Ritratto di Russolo *46*

Ritratto di Severini *49*

Ritratto di Carrà *52*

Autoritratto *55*

5. FINALE *58*

References *61*

Appendix A: FPT2011 – Futurist Painting: Updated Technical Manifesto *65*

University of Cape Town

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University of Cape Town

List of illustrations

(All dimension in centimetres, H x W x D)

FUTURISMO

Carlo Carrá, *Simultaneità* (*Simultaneity)* (1913). Oil on canvas, 146 x 133.

Giocomo Balla, *Ritmi dell' archetto* (*Rhythm of a violinist)* (1912). Oil on canvas, 52 x 75.

Umberto Boccioni, *Forma uniche della continuità nello spazio (Unique forms of continuity in space)* (1913). Bronze, 126.4 x 89 x 40.6.

Gino Severini, *Mare = dansatrice + mazzo di fiori (Sea = dancer + bouquet)* (1914). Oil on canvas with aluminium, 92 x 60.5.

Carlo Carrá, *Uscita da teatro (Leaving the theatre)* (1913). Oil on canvas, 105.5 x 156.

Luigi Russolo, *Profumo (Perfume)* (1910). Oil on canvas, 64.5 x 65.5.

Umberto Boccioni, *Stati d'animo (States of mind) I* : *Gli addii* (*The farewells*) (1911). Oil on canvas, 71 x 96.

Umberto Boccioni, *Stati d'animo (States of mind) I: Quelli che vanno* (*Those who leave*) (1911). Oil on canvas, 71 x 96.

Umberto Boccioni, *Stati d'animo (States of mind) I*: *Quelli che restano* (*Those who stay behind*) (1911). Oil on canvas, 71 x 96.

Carlo Carrá, *Funerali dell' anarchico Galli (Funeral of the anarchist Galli)* (1911). Oil on canvas, 198.5 x 259.

Umberto Boccioni, *Dinamismo di un footeballer (Dynamism of a soccer player)* (1913). Oil on canvas, 195 x 200.

Carlo Carrá, *Free-word painting - Patriotic celebration* (1914). Tempura and collage on cardboard, 38.5 x 30.

Giocomo Balla, *Velocità astratta + rumore (Abstract speed + sound)* (1913). Oil on board in artists painted frame, 54.5 x 76.5.

Gino Severini, *Espansione sferica della luce - centrifuga* (*The spherical expansion of light -centrifugal)* (1914). Oil on canvas, 62 x 50.

Luigi Russolo, Pages from the score of *The Awakening of a city (*1914).

Umberto Boccioni, *Costruzione dinamica di un gallopo: cavallo + casa (dynamic construction of a galloping horse: horse + rider + house)* (1914). Paint and assemblage of wood, cardboard, metal, 60 x 122 x 31.

IDÉE SENSORIALI

Katharina Gross, *One floor up more highly* (2010). Installation view at *MASS MoCA* (Massachusetts Museum of Contemporary Art).

Jean Tinguely, *White moving forms on black background* (*TNT*) (1957). Painted wood and metal motorized construction, 72 x 63.5 x 24.

ART+COM, *Mobility* (2010). Prosthetic hands, mirrors and motors.

Krzysztof Wodiczko, *Hiroshima projection* (1999). Projection onto monument.

Julie Mehretu, *Excerpt (Suprematist evasion)* (2003). Ink and acrylic on canvas. 81 x 137.

Chris Finlay, *McCain Obama (*2008). Acrylic on canvas, 46 x 25.

Matthew Ritchie, *The hierarchy problem* (2004). Installation view at Solomon R. Guggenheim Museum, New York.

Herbert Brandl, *Untitled* (2009). Oil on canvas, 150 x 300.

Lucio Fontana, *Spacial concept: Waiting* (1963). Oil on canvas, 73 x 93.

University of Cape Town

Frank Aurbach, *J.Y.M Seated IV* (1992). Oil on canvas, 65 x 61.

Tomma Abts, *Folme (*2003). Acrylic and oil on canvas, 48 x 38.

Sissel Tolaas, *The FEAR of Smell — the Smell of FEAR (2006).* Installation view at MIT|LVAC (List Visual Arts Centre, Massachusetts Institute of Technology).

Pipilotti Rist, *Elixer – The video organism of Pipilotti Rist (*2009). Installation view at Museum Boijmans van Beuningen, Rotterdam, Netherlands.

Jeffrey Shaw, *Place-Ruhr* (2000). Installation view at Vision Ruhr, Dortmund, Germany.

Jean Tinguely, *Méta-matics No 9* (1958). Round rubber belt, steel rods, painted sheet metal, wire wooden pulleys, clothespins and electric motor, 88 x 142 x 36.

Natasha Kidd, *Flow and Return* (2006). Installation view at The Lowry, Salford , Manchester.

RITRATTI

Gicomo Balla, Autoritratto (1902). Oil on canvas, 59 x 43.

Umberto Boccioni, *Autoritratto* (1905-06). Oil on canvas, 100 x 70.

Carlo Carrá, *Autoritratto* (1951). Oil on canvas, 82 x 37.

Luigi Russolo, *Autoritratto* (1909-10). Oil on canvas, 35 x 30.

Gino Severini, *Autoritratto* (1912-13). Oil on canvas, 75 x 58.

Self portrait (2004). Oil on canvas, 90 x 60.

Etiene-Jules Marey, *Chronophotograph* (c.1882).

Giocomo Balla, *Lines of movement and dynamic sensation (swifts)* (1913). Oil on canvas, 97 x 120.

Ritratto di Balla (2011-2012). Microcrystalline wax on canvas on board with aviation fuel, robotics, speakers and computer generated video projection, 200 x 150.

Umberto Boccioni, *Officine a Porta Romana (Factories at Porta Romana)* (1908). Oil on canvas, 75 x 146

Umberto Boccioni, *Autoritratto* (1908). Oil on canvas, 100 x 70

Umberto Boccioni, *Ritratto della sorella (Amelia) (*1909). Oil on canvas, 110 x 76

Umberto Boccioni, *La strada entra nella casa (The street enters the house)* (1911). Oil on canvas, 100 x 100

Umberto Boccioni, *Materia (Matter)* (1911). Oil on canvas, 225 x 150

Umberto Boccioni, *Visones simultaire (Simultaneous visions)* (1911). Oil on canvas, 70 x 75.

Ritratto di Boccioni (2011-2012). Encaustic, oil and spray paint on canvas on board with robotics, speakers, MP3 players, radio, electronics, metal cans, cutlery, crockery, glasses, bottles, household freshener, vanilla, fabric softener and spay paint on wall. Dimensions variable (five panels 131 x 45 each).

Luigi Russolo. *Automobile in corsa* (1913). Oil on canvas, 104 x 140.

Reconstructed Intonorumori for performance at SFMoMa (San Francisco Museum of Modern art) (2009).

Ritratto di Russolo (music) (2012). Encaustic, enamel and oil on canvas on board with computer, web-cam and speaker, 150 x 100.

Ritratto di Russolo (noise) (2012). Encaustic and oil on canvas on board with robotics, paper, metal, car hooter and battery, 150 x 100.

Gino Severini, *Hieroglyphiqu dynamique du Bal Tabarin (Hieroglyphic dynamic of the Bal Tabarin)* (1912). Oil on canvas with sequins, 161 x 156.

University of Cape Town

Gino Severini, *Blue dancer* (1912). Oil on canvas with sequins, 61 x 46.

Gino Severini, W*hite dancer* (1912). Oil on canvas, 60 x 45.

Gino Severini, *Danaztrice a Pigal (Dancer at Pigal)* (1912). Oil on canvas with plaster and sequins, 69 x 50.

Gino Severini, *Dancer and gypsy* (1913). Oil on canvas, 100 x 75.

Gino Severini, *Argentian Tango* (1913). Oil on canvas in artists painted frame, 105.3 x 85.9.

Gino Severini, *Shapes of a dancer in light* (1913). Oil on canvas in artists painted frame, 87 x 62.

Gino Severini, *Espansione sferica della luce - centrifuga* (*The spherical expansion of light -centrifugal-)* (1914). Oil on canvas, 62 x 50.

Ritrattto di Severini (2012-2013). Enamel on plywood with aluminium, robotics, light fittings. 588 x 540 x 290.

Ritratto di Carra (2012) Oil and acrylic on canvas on board with embedded computer, screen, web cam, speakers and computer generated video, 200 x 150.

Hans Namuth, *Jackson Pollock at work* (1950). Black and white photograph

Lucian Freud, *Painter working, reflection* (1993). Oil on canvas, 102 x 82.

Autoritratto (2012). PMMA (Perspex), computer, web-cam, microphone, robotics, electronic, batteries, canvas and paint, 274 x 262 x 97.

University of Cape Town

1. PRONUNCIAMENTO

For the past few years I have been making abstract paintings and at the same time researching the many physiological and psychological aspects involved when a viewer engages with a work of art - how multiple senses can be stimulated and how perceptions, which are the combination of senses and memories, give rise to æsthetic and emotional responses.

It has been suggested that a better understanding of abstract painting can be obtained through music, since music is the most abstract of the arts and does not, in any way, depend on the depiction of external realities (Vinkovetsky, 1985:164). The idea that a new reality is created from an abstract sensory stimulus (as happens when we listen to music) is, for me, fundamental to explaining the role of the senses in the æsthetics of abstract painting.[1]

Painting and sculpture in their earliest eras are concerned with suggesting or evoking and they use every possible means to do so, without the slightest hint of the stupid notion of artistic finish. In those felicitous ages, there is no such thing as the word "art" and there are none of the artificial distinctions between painting, sculpture, music, literature, philosophy, poetry. . . . Everything, instead, is architecture, for everything in art should be the creation of autonomous organisms constructed with abstract values of reality [...] What can we honestly say about our own paintings, which have only been around for a few months? We are still experimenting and there is no better field for our researches than the intoxicating modernity of contemporary life.

(Umberto Boccioni. *The plastic foundations of Futurist sculpture and painting* (1913)).

It was during my research into the senses and sense-based art that I discovered the writings of the Italian Futurist painters. *Futurist painting: Technical manifesto* (1910), *The plastic foundations of Futurist sculpture and painting* (1913), *The painting of sounds noises and smells* (1913), *The art of noise* (1913) and other manifestos which celebrated the Futurists' sensual experiences of their modern world. I was intrigued that many Futurist ideas on the senses and on perception (ideas which are now a hundred years old) still seemed fresh and relevant and resonated with the issues that I was interested in. So I set out to learn what I could from them, and to see how I could develop art works in response.

Taking the Futurists' writings as my starting point, and after researching the literature on Futurism,[2] I adopted a process similar to one the Futurists themselves had followed. They had published their manifestos and only

University of Cape Town

1. Our ability to perceive through the senses was called αἰσθησισ (æsthesis) by the early Greeks, from which the modern word æsthetics derives.
2. I made use of Umbro Apollonio's *Futurist Manifestos* (1973) and Rainey et al's more up to date *Futurism- an anthology* (2009) as my sources of Futurist manifestos. Marianne Martin's *Futurist art and theory* (1968), Caroline Tisdall's&Bozzola's *Futurism* (1977), Lynton' s *Futurism (1994),* Berghaus' *Futurism and politics: Between Anarchist rebellion and Fascist reaction, 1909-1944* (1996), Richard Humphries' *Futurism* (1999) , Giovanni Lista's *Futurism* (2001), Sylvia Martin's *Futurism (2006),* and Coen's, Lista's & Ottinger's *Futurism (2008),* Di Milia's *Boccioni* (2008), the Guggenheim's *Futurism: a modern focus (1973)*, as well as numerous journal articles and web sites provided valuable theoretical information.

then proceeded to explore the possibilities opened up by their ideas. To revisit these Futurist ideas in a twenty first century context, I published my own *Futurist painting: Updated technical manifesto* (2011) (FPT2011) (Appendix A) which I based on the two 1910 manifestos of Futurist painting, but which included some of my own ideas as well, particularly those regarding multi-sensory art.

The Futurist painters referred to their work as "experiments" and, given the wide range of ideas they were investigating, it is not surprising to see the variety of styles of paintings they produced, even within the body of work of each painter. In response to the ideas and works of the Futurists, I conducted my own series of experiments. The works that came out of these experiments are a series of abstract portraits, one for each of the *gruppo dirigente de pittura* (management committee of the Futurist painters) who had signed the 1910 manifestos. In each work I focused on the individual painter's interpretations of Futurist ideas as expressed in their own paintings and writings. In addition I produced a self-portrait; a synthesis of the Futurist ideas combined with those of my own.

This document is intended to accompany the artworks I produced and serves to describe how I responded to Futurism in my art-making practice. A shortened version of this document is included in the catalogue to the exhibition of works, and is presented as an e-book. In the next section of this document I set out some of the complexities, controversies and contradictions of Futurism that I have encountered in my readings and I expand on the Futurist ideas which have animated my project - the ideas of simultaneity, multiplied sensations, lines of force and placing the spectator at the centre of the painting. Following that I explain the concept of the image in relation to these Futurist ideas and suggests how these images may be presented in different sensory modalities. In addition, I discuss similar ideas found in the works of contemporary artists and I include an explanation of the development of these Futurist ideas as multi-sensory images in my own work. This is followed,

University of Cape Town

in the next section, by a discussion in some detail of the portraits I created which are the result of my own experiments in response to the ideas of individual Futurist painters. The final section presents a summary of my project, listing some of the problems I encounters, the discoveries I made, and questions that have arisen.

With regard to the layout of this document, it should be noted that the right-hand column (side-bar) is used to present both images related to the main text and to provide more extensive quotations. One of the reasons for including these extended quotations is that they help preserve the tenor of the writings by the various authors which is often lost by elision or paraphrasing. This is especially true of the Futurists' writings which are filled with rhetoric, bombast, and youthful exuberance.

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2. FUTURISMO

The first decade of the twentieth century experienced an explosion of ideas and inventions.[3] When Filippo Marinetti, the Italian poet and writer, launched the Futurist movement in 1909, electrification of cities was well underway across Europe. Automobiles had begun rolling off production lines, Marconi had successfully established radio communication across the Atlantic, and Louis Blériot had crossed the English Channel by aeroplane.

The Futurist painters, Umberto Boccioni, Giocomo Balla, Carla Carrà, Luigi Russolo and Gino Severini, a group of young Italian artists, were among the first to join Marinetti's Futurist movement.[4] In this era of technological innovation, they adopted science and technology as the context for *Manifesto Pittura Futurismo (The Manifesto of the Futurist Painters)* (1910), the publication which first set out their ideas on painting. In the ensuing years, the Futurist painters did a good deal of experimentation, trying out their ideas in painting and extending them to other media.

The ideas I find most interesting are those relating to sensation, perception, memory and emotion, which follow directly from their ideas on time, motion and speed. Many of these ideas can be traced to the writings of Ernst Mach (*The analysis of sensations* (1897)), and Herbert Spencer (*First principles* (1867) and *The principles of psychology* (1896)) (Lista 2008:49). Aspects of sensation and consciousness appear throughout Futurist writings and can be identified in their paintings.[5]

MANIFESTOS (1910 to 1915)

Manifesto of the Futurist painters (1910). Boccioni, Carrà, Russolo, Balla, and Severini.	(MFP)
Futurist painting: Technical manifesto (1910). Boccioni, Carrà, Russolo, Balla, and Severini.	(FPTM)
Against passéist Venice (1910). F.T.Marinetti with Boccioni, Carrà, and Russolo.	(APV)
The exhibitors to the public (1912). Balla, Boccioni, Carrà, Russolo, and Severini.	(ETP)
Technical manifesto of Futurist sculpture (1912). Boccioni.	(TMFS)
The art of noises: A Futurist manifesto (1913). Russolo.	(AON)
Plastic planes as spherical expansion in space (1913). Carrà.	(PPSES)
*Plastic dynamism (1913).*Boccioni.	(PD)
Futurist dynamismn and French painting (1913). Boccioni.	(FDFP)
The plastic foundations of Futurist sculpture and painting (1913). Boccioni.	(PFFSP)
The painting of sounds, noises, and smells (1913). Carrà.	(PSNS)
Plastic analogies of dynamism: Futurist manifesto (1913). Severini.	(PAD)
Absolute motion + relative motion = dynamism (1914). Boccioni.	(AMRM)
Futurist men's clothing: A manifesto (1914). Balla.	(FMC)
The antineutral suit: Futurist manifesto (1914). Balla.	(ANS)
Futurist reconstruction of the Universe (1915). Balla with Depero.	(FRU)

3. Inventions between 1900 and 1910 include escalators, radios, vacuum cleaners, neon lights, teabags, windscreen wipers, cornflakes, amplifiers, air conditioners, washing machines, plastic, colour photography, silicone, wire coat hangers, razor blades, artificial fertilizers, instant coffee, synthetic hallucinogenic drugs, zippers and the bra. These were commodities of unprecedented convenience and utility - available to the general public.

4 Balla was 38 and the rest in their twenties. Balla was based in Rome, Severini in Paris, and Boccioni, Carrà and Russolo in Milan.

5. Spencer had proposed that sensation constitutes the raw material of consciousness.

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Above all the other ideas, the Futurist painters embraced those of the French philosopher Henri Bergson (Ottinger, 2008:23).[6] The Futurist painters published their own ideas in a veritable barrage of manifestos - fantastical ideas reflecting changes in the modern metropolis - radical ideas that resonated with the pulse of the machine and the rising city. At *Grande Serata Futurista* (a combination of theatre, musical performance, political meeting and often, quite literally, a riot) they joined the Futurist poets, writers, musicians, actors, dancers and the general public to discuss how human sensibilities were being changed by advances in science and technology.[7] They explored their ideas in novel forms of painting:

universal dynamism,
states of mind,
lines of force,
sensations,
simultaneity,
abstract forms,
inter-penetrating planes,
the spherical expansion of light,
the painting of sounds, noises and smells,
movement and light destroying the materiality of bodies.

After reading Futurist manifestos and seeing many of their works at first hand in Milan and elsewhere, I remained convinced that the Futurist painters' ideas would find new relevance in the twenty-first century. This seemed contrary to Mann's views in *The theory-death of the avant-garde* (1991) or the view expressed by Rainey that Futurism (along with other Modernist movements) "could not be sustained for more than evanescent moments" (2009:47). I was determined to investigate further.

The Futurists' manifestos contain a political and an æsthetic agenda - ideas on how both art and society should be

We must breathe in the tangible miracles of contemporary life – the iron network of speedy communications that envelopes the earth [...] we tell you now that the triumphant progress of science makes profound changes in humanity inevitable, changes which are hacking an abyss between those docile slaves of past tradition and us free moderns, who are confident in the radiant splendour of our future (MFP, 1910).

Studies of Futurism have often succumbed to [the] habit [of] cataloguing the ways in which Futurism shaped German Expressionism or Anglo-American Vorticism, molded Dada or Surrealism—variants of that curious compulsion to establish what has so often been called 'the modern tradition.' But it may well be that there is no 'tradition' to be either discerned or established. Modernism, together with its intense vehicle, the historical avant-garde, was not a form of cultural production that could be sustained for more than evanescent moments. It offered not a history of beginnings and developments, but a protracted series of endings, innovations that swiftly exhausted themselves, corridors that always had 'no exit' written irrevocably on the farthest wall.

University of Cape Town

6. Giovanni Papini translated Bergson's *Introduction to Metaphysics* into Italian in 1908 and translated a selection of his other writings into Italian in 1909. (Ottinger, 2008:22). Boccioni quotes directly from Bergson in *PFFSP (1913).*
7. It has often been suggested that art and science represent similar modes modes of thinking (Humphries, 1999:15). In *The Founding and Manifesto of Futurism* (1909) F.T Marinetti wrote "time and space died yesterday" and in *Futurist painting:Technical manifesto (*1910) the painters wrote "movement and light destroy the materiality of bodies" - Albert Einstein's *On the electrodynamics of moving bodies* (1905) and other papers published between 1905 and 1907 contains similar ideas on the relationship between matter, energy and speed, and on how light and matter interact (Bodanis, 2000:205 and Heitler, 1949:182-183). Einstein's papers were published in obscure physics journals (Schilpp,1949), and it is doubtful that the Futurists were aware of any of these when they published F&MF, MFP and FPTM - nor, for that matter, were most scientists!

revitalised. Many of their political ideas derive from the writings of Friedrich Nietzsche whom the Futurists had read (Wittman, 2009:417). I personally find their political ideas abhorrent, and return to this issue later in this section. However, their æsthetic ideas interest me immensely, and it is to these ideas that I now turn.

Futurism was just that. Alluring, vulgar, ludicrous, chilling, monstrous, farcical, grim—it remains one of the great dead ends of Modernism (Rainey, 2009:47).

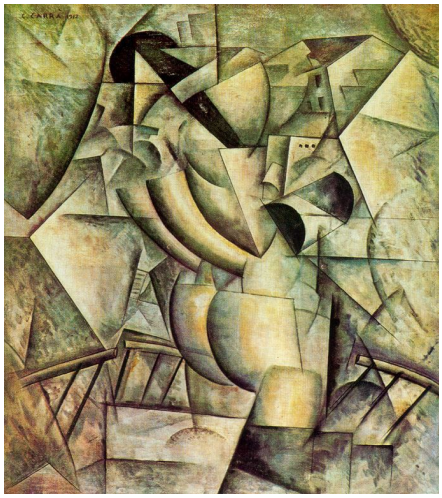
Simultaneity and states of mind

The Futurist painters needed to find a language within painting to express their stated ideas. How, for instance, should "the sum total of visual sensations" or "the simultaneous states of mind" (ETP, 1912) be painted when the notion of speed, which had recently become integral to that experience, seemed to de-materialise objects leaving behind "rapid vibrations in the space which they traverse" (FPTM, 1910)?

The Futurists had numerous attempts at incorporating time, movement and speed into their paintings, but it was not until after 1911, when Boccioni, Carrá and Russolo had returned from visiting Severini in Paris and had been introduced to works and ideas of Picasso and Braque and had met Metzinger, Fauconnier, Leger and Gleize, that a more coherent approach was adopted (Martin, 1968:81, 110, Rainey, 2009:12-13). The Cubist language of fragmented forms provided the Futurists with a partial solution to representing the idea of "simultaneousness of the ambient" (ETP, 1912). This language was appropriated into such works as Carrá's *Simultaneitá – The woman on a balcony* (1912) and Boccioni's *Materia* (1912). However Cubism was essentially static and Futurism demanded the representation of space and time simultaneously - how objects move relative to their environment - the "living object in its dynamic growth" (ETP, 1912).

Discussions around space and time were certainly topical issues in science and philosophy at that time. Bergson's *Time and free will: An essay on the immediate data of consciousness* (1889) and his *Introduction to metaphysics* (1903) had discussed the inter-penetrating, qualitative multiplicity of images ("the immediate data of consciousness") and how space and time are perceived both separately and as "duration", combining them whilst

In painting a person on a balcony, seen from inside the room, we do not limit the scene to what the square frame of the window renders visible; but we try to render the sum total of visual sensations which the person on the balcony has experienced [...] Modern painting, however subjective, has hitherto always presented a spectacle of images which exist in front of our eyes. And though the Cubists showed objects in all their complexity—a painting constructed through a harmonious combination of one or more complexities within an environmental complexity—the spectacle itself did not change. What we want to do is show the living object in its dynamic growth. [...] We reject any a priori reality; this is what divides us from the Cubists and places us Futurists on the extreme fringe of the painting world (ETP, 1912).



Carlo Carrá, *Simultaneitá (1912).*

The simultaneousness of the ambient [implies] the dislocation and dismemberment of objects, the scattering and fusion of details, freed from accepted logic, and independent from one another. [...] You must render the invisible which stirs and lives beyond intervening obstacles,

University of Cape Town

conserving the past (Bergson, 1889:90-91). Einstein's paper *On the electrodynamics of moving bodies* (1905), on the other hand, had proposed that space and time were a single unified entity – which he referred to as "space-time".[8]

The Futurists found several solutions to representing space-time. Severini's *Hieroglyphe dynamique du Bal Tabarin (Hieroglyphic dynamics of the Bal Tabarin)* (1912) shows movement as a series of repeated and fragmented forms, a combination of Cubist ideas and Marey's chrono-photographic techniques.[9] Marey's "kinetographs" reveal not just repeated images but also rhythmic lines. In 1912 Balla began a detailed scientific study of light and movement (Lista, 2001:80-81) and produced a number of novel paintings including *Guinzaglio in moto (Dynamism of a dog on a leash)* (1912), *Ritmi dell' archetto* (*Rhythm of a violinist)* (1912) and *Linee andamentali + successioni dinamiche (Lines of force + dynamic sequence - flight of swifts)* (1913), all combining repeated images and rhythmic lines. In *Bambina che corre al balcone (Girl running on a balcony)* (1912) Balla tried another approach, painting movement as replicated forms made from repeated figures broken into fragmented patches of colour, incorporating the idea that "due to the persistence of an image upon the retina, moving objects constantly multiply themselves, change shape, succeeding one another" (FPTM, 1910).

Boccioni took a different tack. He proposed that as dynamic objects expand in space and time, they create "unique forms". But these forms are de-materialised, for, as the Futurists stated from the outset, "movement and light destroy the materiality of bodies" (FPTM, 1910). Here Boccioni is relying on Bergson's idea that movement takes priority over the thing that moves, and that the thing that moves is an abstraction of the movement (Bergson, 1896:268-269). In Boccioni's *Dinamismo di un footeballer (Dynamism of a soccer player)* (1913) mutated human forms and planes inter-penetrate one another.[10] Boccioni went on

what we have on the right, on the left, and behind us, and not merely the small square of life artificially compressed, as it were, by the wings of a stage (ETP, 1912).

Dynamism [...] is a general principle of simultaneity and interpenetration; it dominates everything that, in movement, is appearance, detail, or shading (AMRM, 1914).

The tram rushes into the houses which it passes, and in their turn the houses throw themselves upon the tram and are merged with it [...] All things move, all things run, all things are rapidly changing. A profile is never motionless before our eyes, but constantly appears and disappears. On account of the persistency of an image upon the retina, moving objects constantly multiply themselves, change shape, succeeding one another, like rapid vibrations, in the space which they traverse. Thus a running horse has not four legs, but twenty (FPTM, 1910).

Balla, *Rhythm of a violinist* (1912).

Painting has renewed itself, has broadened and deepened its scope, by studying how landscape and the environment simultaneously play on the human figure and on objects, thereby achieving our Futurist interpenetration of planes (PFFSP, 1913).

8 The title of Einstein's paper sounds remarkably similar to the titles of the Futurists' paintings. In 1922 Einstein and Bergson held a famous public debate which highlighted the differences between the scientific and the philosophical concepts of time and space (Robbins, 2010:530).

9. The French scientist and physiologist, Etiene-Jules Marey, invented a camera capable of capturing a series of rapid images on the same photographic plate (kinetographs) to further his scientific studies of anatomy. He published his studies of birds and moving animals and humans in *Le vol des oiseaux* (*The flight of birds*) (1890) and *Le mouvement* (1894) and Balla is known to have studied them (Martin, 1968:177, Tisdall&Bozzolla, 1977:66). Marey's images show the rhythms inherent in the motion of the bodies of humans and animals and of birds in flight.

10. Formally, the Futurist painters used the same device for interpenetration as they used for enhanced sensations, namely Divisionism,

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to translate his painting ideas into sculpture and produced a series of works including *Forma uniche della continuità nello spazio (Unique forms of continuity in space)* (1913) .

The idea of simultaneity, superimposition and interpenetration were often expressed using the mathematical symbol "+".[11] From 1912 onwards, a number of paintings and sculptures bore titles containing this "+" symbol. Examples include Balla's *Car+speed+light* (1913), Carrá's *Donna + bottiglia + casa (Woman + bottle + house)* (1913), Severini's *Mare = dansatrice + mazzo di fiori (Sea = dancer + bouquet)* (1914) and *Boccioni's Costruzione dinamica di un gallopo: cavallo + casa (dynamic construction of a galloping horse: horse + rider + house)* (1914). The "+" symbol also appears in the titles of manifestos as for example, *Absolute motion + relative motion = dynamism* (1914) and in Futurist literature where "+" was used as a way of abolishing adjectives – replacing them instead with the juxtaposition of two nouns as for example in the title of Boccioni's onomatopoeic (concrete) poem "*Scarpetta da società + orina*, (*High society shoe+urine)* (1913).[12]

Not satisfied with just the the four dimensions of space-time, the Futurists attempted to engage with the reality of the overstimulated sensorium of the modern metropolis – they wanted their canvases to capture the experience of the individual both sensually and emotionally. In ETP (1912) they declared: "The simultaneousness of states of mind in the work of art: that is the intoxicating aim of our art".

By entering into the domain of "simultaneousness of states of mind" the Futurists moved into psychophysical simultaneousism - an idea that adopted the Bergsonion concept of psychic duration (Coen, 2008:54). In this regard, the Futurists were certainly influenced by Soficci's essay *Le due perspective (The two perspectives)* (1910)[13] which, paraphrasing Bergson, recommended that linear perspective should be abandoned in favour of *prospettiva psicologica*

Boccioni, *Unique forms of continuity in space* (1913).

Severini, *Sea = Dancer + bouquet* (1914).

Using analogies, we can penetrate the most expressive part of reality and simultaneously render matter and will in their most intensive and expansive action. With the interpenetration of planes and the simultaneity of environment, we have been able to render the reciprocal influence of objects and the environmental vitality of matter (intensity and expansion of object + environment); with plastic analogies we can infinitely enlarge the range of these influences, continuities, desires, and contrasts, whose unique form is created by our artistic sensibility and expresses the absolute vitality of matter, or universal dynamism (intensity and expansion of the object + environment through the entire universe, as far as its specific but diverse correlative) (PAD, 1913)

Representative sensation, looked at in itself, is pure quality ; but, seen through the medium of extensity, this quality becomes in a certain sense quantity, and is called intensity. In the same way, our projection of our

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where solid forms had already been broken into separate chromatic paintmarks , thus facilitating interpenetration forms and planes.

11. The Futurists used the terms simultaneity, superimposition and interpenetration almost interchangeably to express the idea that rapidly moving solid objects and their environment are perceived as a single complex form.

12. This is in accord with Marinetti's *Technical Manifesto of Futurist Literature* (1912*), Destruction of syntax (*1913), and *Geometric and mechanical splendor and the numerical sensibility* (1914).

13. Soffici paraphrased Bergson's advice to artists "to obey only the dictates of his spirit and to penetrate the material veil to discover reality" (Martin 1968:89).

(psychological perspective) (Martin, 1968:89). Boccioni painted the first of his S*tates of mind* triptychs in 1911[14] adopting this psychological perspective - the cumulative effect of sensations on memory. In the three panels Boccioni depicts "the emotional complexes which unwittingly unite human beings" - *Gli addii, Quelli che vanno* and *Quelli che restano* (*The farewells, Those who leave,* and *Those who stay behind*) (1911) (Martin, 1968:93-95).

> *psychic states into space in order to form a discrete multiplicity is likely to influence these states themselves and to give them in reflective consciousness a new form, which immediate perception did not attribute to them. Now, let us notice that when we speak of time, we generally think of a homogeneous medium in which our conscious states are ranged alongside one another as in space, so as to form a discrete multiplicity. Would not time, thus understood, be to the multiplicity of our psychic states what intensity is to certain of them, a sign, a symbol, absolutely distinct from true duration? Let us ask consciousness to isolate itself from the external world, and, by a vigorous effort of abstraction, to become itself again* (Bergson, 1889:90).

Multiplied sensation

Just as the Futurists had responded to the dynamism of modern technology with ideas on interpenetration and states of mind, so too did they respond to the vibrancy of the city, the electric lights and the "ultra-recent psychology of noctambulism" (MFP, 1910) by seeking to increase the intensity of visual stimuli in their paintings. They proposed two interrelated strategies; using saturated primary and secondary colours (reds that shout, greens that scream, yellows that explode) (PSNS, 1913)), and using Divisionism, applying separately painted marks of contrasting complimentary colour (FPTM, 1910).

> *And how can we remain unresponsive to the frenzied activity of the great capitals, the ultra-recent psychology of noctambulism, the feverish figure of the bon viveur, the cocotte, the apache, and the alcoholic* (MFP, 1910) .

> *The time has passed for our sensations to be whispered – We wish them in future to sing and re-echo upon our canvasses in deafening and triumphant flourishes* [...] *The shadows that we shall paint will be more luminous than the highlights of our predecessors, and our pictures, next to those of the museums, will shine like blinding daylight compared with deepest night [...] Painting cannot exist today without Divisionism. This is not a technical device that can be methodically learned and applied at will. Divisionism, for the modern painter, must be an innate complement-ariness, which we deem essential and necessary* (FPTM, 1910).

> *There can be no modern painting without the starting point of an absolutely modern sensation, and no one can contradict us when we state that painting and sensation are two inseparable words* (ETP, 1912).

While these strategies stand in stark contrast to the *chiarascuro* painting that had been perfected by Italian artists in the previous four hundred years (exactly the art that the Futurists sought to overturn),[15] they were not really novel ideas. Both had been used by the French Impressionists and Neo-impressionists of the late 19th and early 20th century.[16] In fact, the Futurist painters had been painting in this Divisionist style prior to 1910 (as seen for example in Balla's *A workers day* (1904), Boccioni's *Officine a Porta Romana (Factories at Porta Romana)* (1909) and Severini's *Printemps à Montmartre (Spring in Montmarte)* (1909).[17]

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14. Boccioni painted two versions of this triptyche. The first (*Museo del novecento,* Milan), makes use of elongated brush strokes to evoke emotion. The second (*MoMa*, New York) was painted after his return from Paris and shows a distinctive Cubist influence.
15. "Our task is to destroy four centuries of Italian tradition" (PFFSP, 1913).
16. The Pointalist, Seurat, arguably took these ideas furthest by embracing the scientific ideas of "simultaneous contrasts" that Michel Chevreul had published in *The principles of harmony and contrast of colours, and Their applications to the Arts* (1855).
17. Boccioni and Severini had been students of Balla's in Rome, and had learned to paint in the Divisionist style from him. Gaetano

Futurist works, such as Boccioni's *La Città che sale (The city rising)* (1910), Russolo's *Perfumo (Perfume)* (1910) and Carrá's *Uscita da teatro (Leaving the theatre)* (1910-11) show that in the early years of Futurism, they merely continued in this vein .

While the initial painting manifestos proposed the technical solution of Divisionism, Carrá's manifesto, *The painting of sounds, noises and smells* (1913), hints at something more. He states that "any continued series of sounds, noises and smells imprints on the mind an arabesque of form and colour" (PSNS, 1913) . This could be taken purely metaphorically but it has a physiological underpinning as well. For synæsthetes (whose neural interconnections transfer stimulii across sense-modalities), colours really can be triggered by sounds and smells and *vice versa*. Many synæsthetes report seeing musical keys as distinctive colours or seeing vivid fields of colour or shapes when certain music is played (Sacks, 2007:172-177). Martin claims that the Futurists had inherited synæsthetic tendencies from the *Scapigliatura*[18] and Russolo, in his *Profumo (Perfume)* (1910), depicts the visual correspondence between olfactory and auditory sensations (1968:83-84). Similarly, in *La Music (Music)* (1911-12), Russolo investigates the phenomenon of *audition coloré (colour-sound synæsthesia)* (Martin, 1968:90 and Chessa, 2012:102). So while it is not certain that Carrá had synæsthesia in mind when he wrote his manifesto, the idea of deliberately soliciting a synæsthetic response would certainly fulfil the aims of the Futurist painters.[19]

Carrá, *Leaving the theatre* (1910-11).

[Painting demands] sensations which are generated by sounds, noises, and smells, and all the unknown forces involved in these. […]
a new intuitive shading of white, grey, black, can add to the emotive power of surfaces, while the hue of a coloured plane will violently accentuate the abstract meaning of a plastic fact (PFFSP, 1913).

Before the nineteenth century, painting was an art of silence. The painters of antiquity, the Renaissance, the seventeenth and eighteenth centuries never envisaged the possibility of rendering sounds, noises, and smells in painting, even when they chose fragrant flowers, raging seas, or stormy skies as their themes. The Impressionists in their daring revolution made some confused and hesitant attempts at sounds and noises in their pictures. Before them—nothing, absolutely nothing! […]
The painting of sounds, noises and smells demands:
1. Reds, rrrreds, the rrrrredest rrrrrrreds that shouuuuuuuut
2.Greens, that can never be greener, greeeeeeeeeeens, that screeeeeeeam; yellows as explosive as possible; polenta yellows, saffron yellows, brass yellows.
3. All the colours of speed, joy, revelry, and fantastic carnivals, fireworks, cafés-chantants, and music-halls, all colours that are seen in movement, colours experienced in time and not in space (PSNS, 1913).

Rossolo, *Perfume* (1910).

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Previati (1852–1920), who was the leading exponent of Divisionism in Italy, published *La tecnica della pittura* (1905) and *I principi scientifici del divisionismo* (1906) explaining its theory (Rainey, 2009: 525).
18. The *Scapigliatur* were a bohemian artistic group which formed in Italy at the turn of the twentieth century.
19. I am here not discussing how artists, such as Kandinsky, have used their synæsthesia to make their own artworks – my point is whether artists deliberately evoke the effect of synæsthesia for example by using separated colours which are known to represent musical notes and keys – Russolo, for example, explained that in *La Musica* (*Music)* (1911-12) his colours represent musical scales.

Dynamism (Lines of force and dynamic sensation)

As with so many of their ideas, it was the Futurists' reading of Bergson that gave rise to the idea of representing an object's lines of force rather than the object itself – that is to say, the idea of representing reality as an abstraction of movement and forces – the painting of "dynamic sensation".[20]

The Futurists experimented with a number of variations of lines of force to express sensation. Russolo, in *La rivolta* (*Rebellion)* (1911-1912) and *Automobile in corsa* (*Speeding car)* (1913) shows lines of force as a sort of "shock wave" emanating from the speeding object or the crowd. Severini's paintings of a dancer, *La Chahuteuse/Dinamismo di una danzatrice/ (Dynamism of a dancer) (*1912), shows movement as a series of fragmented forms (derived from Cubism), but with lines added indicating the dancer's movement. Balla, in his *Linee andamnetali + successioni dinamiche (Lines of force + dynamic sequences) (swifts)* (1913), combines both fragmented images and rhythmic lines showing the path of the birds in flight, and in *Synthesis of movement* (1917) he creates a purely abstract field of force lines.

The painting that perhaps best captures the Bergsonian ideal of lines of force is Carrá's *Funerali dell' anarchico Galli (Funeral of the anarchist Galli)* (1911). In this large painting, lines echoing the movement of horses,the police and the crowd are combined with sheaves of lines creating regions of dynamic movement. The lines, corresponding to all the conflicting forces, bring the viewer into the action so that the viewer is "obliged to struggle himself with the personages in the picture"(ETP, 1912). The *Funeral of the anarchist* seems to have not just a psychological, but a real physical effect. That is to say, Carrá's lines of force not only depict motion, but also have an effect on the spectator who seems to feel the motion in their own bodies.

Boccioni combined the idea of lines of force with "dynamic sensation" and in *Stati d'animo (States of mind)* (1911) he uses lines to convey emotions rather than force. In the

The gesture which we would reproduce on canvas shall no longer be a fixed moment of universal dynamism. It shall simply be the dynamic sensation itself (FPTM, 1910).

Dynamism is the simultaneous action brought about by the interplay between an object's specific, characteristic motion (absolute motion) and the transformation which the object undergoes in its changes in relation to the environment (relative motion), whether that be mobile or static (AMRM, 1914).

We have declared in our manifesto that what must be rendered is the dynamic sensation. That is to say, the particular rhythm of each object, its inclination, its movement, or, to put it more exactly, its interior force (ETP, 1912).

Bring in Faraday's centres of force : the lines of force emitted in every direction from every centre bring to bear upon each the influences of the whole material world [...]
We may still speak of atoms; the atom may even retain its individuality for our mind which isolates it but the solidity and the inertia of the atom dissolve either into movements or into lines of force whose reciprocal solidarity brings back to us universal continuity. (Bergson, 1896: 31, 265).

"for us, the object has no form in itself; the only definable thing is the line which signifies the relationship between the object's weight (quantity) and its expansion (quality). This has suggested to us the notion of force-lines, which characterize the object and enable us to see it as a whole—it is the essential interpretation of the object, the perception of life itself (PFFSP, 1913).

20. Many Futurist ideas were couched in terms of "Dynamism, a term they used to describe just about everything from speeding objects and frenetic modern life to sensations and emotional responses. Dynamism (from the Greek *dunamis* meaning power) is often used to describe "force" or "energy" . Marinetti had initially intended calling his movement "Dynamism", but in 1908 decided on "Futurist" which he felt was more poetic (Martin, 1968:40)

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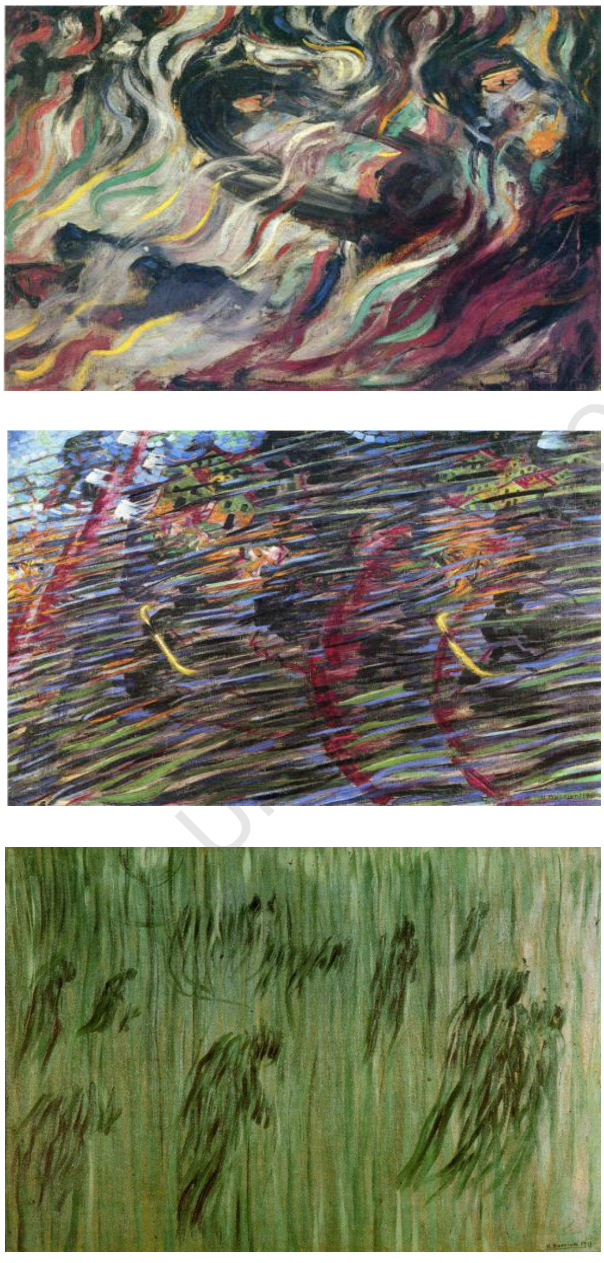
catalogue to the 1912 exhibition he presented a grammar of these lines - a theory of psychophysical simultaneism reflecting the "extraordinary contemporaneity with the mutations of life and the processes of the alteration of reality" (ETP, 1912)- S*tates of mind* deals with "psychic energy" and Boccioni has used lines of force to "transcribe the sensation that comes to upset the Bergsonian *élan vital* and break apart the organisation of the individual's inner dynamism" (Lista, 2008:46).[21]



Boccioni, *States of mind* (first version – 1911).

All objects, in accordance with what the painter Boccioni happily terms physical transcendentalism, tend to the infinite by their force-lines, the continuity of which is measured by our intuition. It is these force-lines that we must draw in order to lead back the work of art to true painting. We interpret nature by rendering these objects upon the canvas as the beginnings or the prolongations of the rhythms impressed upon our sensibility by these very objects (ETP, 1912).

The object is not seen in its relative motion, but is conceived according to its living lines, which reveal how its motion would be broken down according to the tendencies of its forces (AMRM, 1914).

In the pictorial description of the various states of mind of a leave-taking, perpendicular lines, undulating and as it were worn out, clinging here and there to silhouettes of empty bodies, may well express languidness and discouragement. Confused and trepidating lines, either straight or curved, mingled with the outlined hurried gestures of people calling one another, will express a sensation of chaotic excitement. On the other hand, horizontal lines, fleeting, rapid, and jerky, brutally cutting into half lost profiles of faces or crumbling and rebounding fragments of landscape, will give the tumultuous feelings of the persons going away(ETP, 1912).

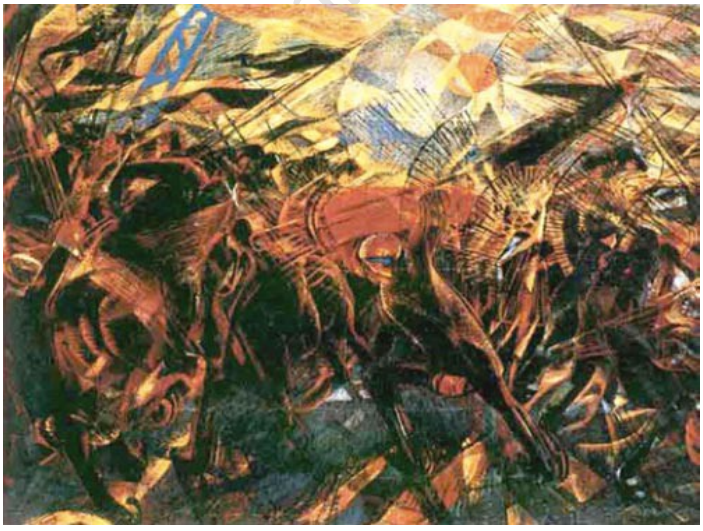
21. The titles *Gli addii, Quelli che vanno* and *Quelli che restano* (*The farewells, Those who leave,* and *Those who stay behind*) recall Beethoven's *Les Adieux* sonata in E flat major (1809-10), whose three movements *Les Adieux, L'Absence* and *Le Retour* describe different states of mind (Martin, 1968:93).

The affective body – the spectator in the centre of the picture

Perhaps the most important of Bergson's concepts adopted by the Futurists is "embodied perception" which provided the theoretical basis of the Futurist proclamation that the spectator must be placed at the centre of the painting.

FPTM (1910) derided the "stupidly traditional" approach of painting a scene viewed from the outside (using linear perspective) rather than placing the spectator "in the centre of the picture" (using psychological perspective). Carrá's manifesto PPSES (1913) explains that multiple perspectives in their paintings "correspond to a vibration in the mind" (namely to sensations and perceptions), Boccioni's PFFSP (1914), in rejecting linear perspective, explains that a painting is "an emotive architectural environment which creates sensation and completely involves the spectator", and in ETP (1912), the Futurists wrote that the soul of the spectator must be blended into the canvas so the spectator takes part in the action.

Carrá's *Funerali dell' anarchico Galli* (*Funeral of the anarachist Galii)* (1911), which I have already discussed with reference to lines of force, uses bold reds and oranges to convey anger and aggression - colours which combine with deep blue and black repeated angular shapes and lines to draw the spectator into the centre of the action (Humphries, 1999:33, Antliff, 2000:730).



Carrá, *Funeral of the anarchist Galli* (1911).

The construction of pictures has hitherto been stupidly traditional. Painters have shown us the objects and the people placed before us. We shall henceforward put the spectator in the centre of the picture (FPTM, 1910).

With the desire to intensify the æsthetic emotions by blending, so to speak, the painted canvas with the soul of the spectator, we have declared that the latter must in future be placed in the centre of the picture. He shall not be present at, but participate in the action. If we paint the phases of a riot, the crowd bustling with uplifted fists and the noisy onslaughts of cavalry are translated upon the canvas in sheaves of lines corresponding with all the conflicting forces following the general law of violence of the picture. These force-lines must encircle and involve the spectator so that he will in a manner be forced to struggle himself with the persons in the picture (ETP, 1912).

Drawing on presumably profound powers of intuition and creativity, the artist-genius was to sense the organic unity of the work and propel the spectator into its tumultuous center. This ideal of making the spectator 'live' the work, through an empathic identification with its emotive core, was intended to rupture the æsthetic distance that governed the relation of most viewers to traditional works of art. Having rejected artistic autonomy, Futurism also rejected passive or contemplative modes of reception (Poggi, 2009:306).

University of Cape Town

It has been noted that not only do Carrá's lines, forms and colour act to encircle and involve the spectator, but also the lack of open foreground denies the spectator the spacial distance from which to safely observe the conflict (Poggi, 2009:312). Furthermore, the large format (1997 x 2591 mm) acts to fill the spectator's peripheral vision such that the spectator is immersed in the picture.

Here is a system of images which I term my perception of the universe, and which may be entirely altered by a very slight change in a certain privileged image, my body. This image occupies the centre; by it all the others are conditioned; at each of its movements everything changes, as though by a turn of a kaleidoscope (Bergson, 1896: 12).

Progression towards pure abstraction

The 1910 manifestos proposed many new ideas and, as discussed, much experimentation took place prior to the international exhibition of Futurist painting in 1912. After that exhibition the Futurists faced criticism, especially in Paris, where unfavourable comparisons with Cubism were made, particularly with regard to use of subject matter. Apollinaire wrote: "While our avant-garde painters [the Cubists] no longer paint any subject in their pictures, the subject is often the most interesting thing on the canvas of the *pompiers* [the Futurists]" (Appolinaire quoted in Martin, 1968:124). This criticism and Boccioni's controversial clash with Léger over the pre-eminence of certain ideas, prompted the Futurists to re-appraise their paintings and ideas and to extend their theories. "Pictorial dynamism" became "plastic dynamism" (Lista, 2001:75). Boccioni's *pittura degli stati d'animo* (The paintings of states of mind) became "spiritualised objective elements [...] given by pure mathematical values, by pure geometric dimensions" and "the *ambiente* in which they will live will be a particular rhythm in the emotion which surrounds them" (Boccioni quoted in Martin, 1968:125). Thus from around 1912, there is a marked progression in Futurist painting towards pure abstraction. This shift in their theoretical ideas was marked by manifestos published by the painters individually, each expanding on their original (collective) ideas in a more personal manner.

Boccioni, *Dynamism of a soccer player* (1913).

What I am claiming here is not an insane abstraction, as many have thought when deriding our experiments. On the contrary, it is the static character of traditional art that is a counternatural abstraction, a violation, a separation from the real, a conception that tries to stand outside universal motion's law of unity (Boccioni. AMRM, (1914)).

Carrá, *Free-word painting - Patriotic celebration* (1914).

The painting of sounds noise and smells demands [...] Abstract plastic wholes, that is, those which correspond not to sight, but to sensations which are generated by sounds, noises, and smells, and all the unknown forces involved in these.

These plastic polyphonic, polyrhythmic, and abstract wholes correspond to the necessity for an internal enharmonic

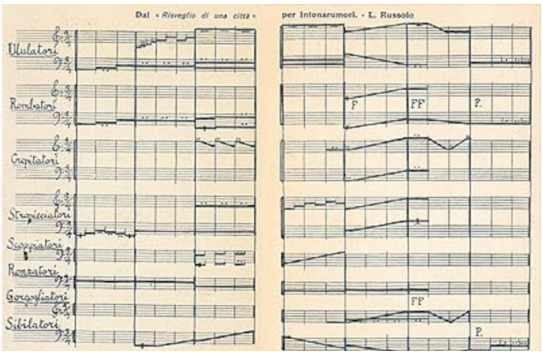
The result of these theories and the progression of ideas in painting is perhaps most noticeable in Balla's studies of automobiles and speed and Severini's studies of dancers and light from around that time. In Balla's *Velocità astratta + remore (Abstract speed + sound)* (1913) and *Plastica di luci (The plasticity of light)* (1913), figuration gives way to an

University of Cape Town

interpenetration of abstract geometric forms. In *Espansione sferica della luce - centrifuga* (*The spherical expansion of light -centrifugal-)* (1914) Severini removes all reference to the material form of his dancers, painting the light as pure abstraction. Severini also began introducing other materials into his paintings, such as sequins and pieces of shaped aluminium to catch and reflect real light. Carrá experimented with "plastic abstractions" using collaged text.[22] Boccioni's ideas would eventually lead him to a radically new form of sculpture of "dynmanic forms" and Balla to "abstract reconstructions" made of various materials – some of which, it is worth noting, made a noises (Martin, 1968:201).

Russolo was the only one of the group who did not make the transition to pure abstraction in his painting – yet his shift was perhaps the most radical of all. Accompanied by the publication of T*he art of noise* (1913), Russolo abandoned painting and set out to develop *intonarumori* (noise intoners) and to write atonal music such as *Risveglio di una città (Awakening of a city)* (1914), for which he developed a new musical notation. In his letter to the Futurist musician Francesco Pratella, Russolo writes

> "I am a Futurist painter who is using a much loved art to project my determination to renew everything. Which is why, more daring than any professional musician could be, not worrying myself about my apparent incompetence and convinced that boldness possesses all rights and seizes all possibilities, I have been able to intuit the great renovation of music through the Art of noises."
>
> (Russolo. AON, (1913))



Russolo, Pages from the score of *The awakening of a city (*1914).

relation which we Futurist painters believe to be indispensable for pictorial sensibility. Because of their mysterious fascination, they are much more suggestive than those created by our visual and tactile senses, since they are so much closer to our pure plastic state of mind (Carrá. PSNS, 1913).

Balla, *Abstract speed and sound* (1913).

Severini, *Expansion of light (Centripital and centrifugal)* (1913).

An overpowering need for abstraction has driven me to put on one side all realisation of mass and of form in the sense of the pictorial relief. By the simple indications of values and of mass I have arrived at the arabesque[…] these […] are plastic rhythms (Severini quoted in Martin, 1968:143).

Boccioni, *Dynamism of a speeding horse + houses* (1914-1915).

22. In contrast to the Cubists use of text, Futurist texts were often chosen for their sounds rather than their shapes. Giovani Lista claims that in the history of avant-garde art, the Futurists were undoubtedly the first to use collaged text (2001:91).

University of Cape Town

Complexity, Controversy, Contradiction

The ideas and actions of the Futurist painters are inexorably linked with all aspects of the Italian Futurist movement, embracing all forms of artistic expression and with a program that required the æstheticisation of both politics and everyday life. The painters were often in the thick of things; provocations, protests, fisticuffs, riots, and the inevitable arrests. The Futurists set out to be deliberately controversial and throughout its history Futurism remained self-contradictory.

I suddenly felt that articles, poetry and controversies were no longer enough. It was absolutely crucial to switch methods, get out into the streets, lay siege to theatres, and introduce the fisticuff into the artistic struggle (F. T. Marinetti, *Guerra sola igiene del mundo* (1908) quoted in Ottinger, 2008:77).

Any discussion of Futurist ideas would thus be incomplete without some mention of the controversies and contradictions of Futurism, and the complex relationship between its æsthetic and political agendas. Some of the declarations and actions of the Futurists cannot be supported or condoned. The Futurists' glorification of war, their contempt for women and their support of Mussolini and Facism are particularly objectionable.

However, these aspects of Futurism are far more complex than one is often lead to believe and need to be taken in context. In the *Founding and Manifesto of Futurism (*1909) (F&MF), Marinetti announced: " We intend to glorify war [...] militarism, patriotism, the destructive gesture of anarchists, beautiful ideas worth dying for", an idea that he explains and expands in a later essay *War, the only hygiene of the world* (1911). Some authors see Marinetti's proclamations as merely *avant-garde* anti-rhetoric (Wittman, 2009:409), where "the violent annihilation of the past," was necessary for the "complete æstheticization of politics and everyday life" (Bowler, 1991:764). Certainly, in glorying war, the Futurists could never have foreseen the horrors that were to follow when the "Great War" engulfed Europe five years later .

Woman and man are the two notes without which human accord would not be possible. You should have women be equal with you in civic and political life (Marinetti , *The Vote for Women,* 1919).

Along with the glorifying war, F&MF expresses "contempt for women" and its "fight against feminism". Indeed the founding manifesto appears downright sexist "casting the Futurist epistemological and æsthetic model into a gendered situation, which sets up an aggressive, virile subject against a feminized reality to be conquered or destroyed" (Blum, 1990:198). Yet in practice, the Futurists challenged the traditional perceptions of gender roles and advocated equal rights for Women, and the Futurists were especially

University of Cape Town

supportive of Women artists.[23] Marinetti's *Contempt for woman* (1911) , contrary to its title, expresses contempt for the role of women in Italian society at that time and it seeks support of the Suffragettes. Ultimately the Futurist movement, rather than holding women in contempt, gave them the opportunity to be intellectually visible within a male dominated Italian society (Tesho, 2010).

For many the most controversial aspect of the Italian Futurist movement is its relationship with the Fascism of Benito Mussolini. Marinetti first met Mussolini in 1918 and originally saw the possibility of the Fascists being absorbed into his *Partito Politico Futurista* (the Futurist party) which he had just founded (Berghaus, 1996:114 and Rainey, 2009:24). History proved the opposite. The Futurist party was disbanded in 1919 and many Futurists (including Balla) joined the Fascists. Marinetti himself was elected as member of the central committee of the Fascist party. However Marinetti's diaries of his early meetings reveal that Mussolini he was not entirely supportive of him and Marinetti later saw Fascism as hostile to Futurism (Berghaus, 1996:210). Marinetti resigned from the Fascist party in 1920, calling them "a flock of passeists" (Tisdall & Bozzolla, 1977 : 206-208) and declared that henceforth Futurism would concern itself only with æsthetic issues. Yet in 1924 Marinetti published *Futurism and Fascism* in which he writes how Futurism had served as an important precursor to Fascism, and that Fascism had satisfied the minimal program of Futurism (Rainey, 2009 :34). Paradoxically when Mussolini created the *Italiano* (the Italian Royal Academy) in 1929, Marinetti, together with Marconi and Pirandello, became its inaugural *Academico* (Rainey, 2009:32), notwithstanding Marinetti's statement in F&MF (1909) that he intend to destroy academies of every sort.

It is unfortunate that these political ideas have diverted attention away from the Futurists' æsthetic ideas and that the formal ideas of Futurist painting have often received only cursory attention in comparison with other *avant-garde* art movements of the early twentieth century. Futurism's

Marinetti's Manifesto of the Futurist Party (1918) calls for:

+Italy to no longer be subservient to its great Past.
+Abolition of many useless universities.
+Anticlericalism to liberate Italy from the church, priests, monks, nuns, Madonnas, wax candles, and church bells.
+Easy divorce. A gradual devaluation of matrimony in favour of free love.
+military education and sports in schools.
+In art we must abolish commemorative patriotism, the mania for monuments, and all State interference in the arts.
+A maximum legal working day of eight hours. Equal pay for equal work by men and women.
+The Futurist political party which we establish today, and which we will organize more fully after the war, will be firmly distinguished from the Futurist artistic movement.
+All Italians, men and women of whatever class or age, can adhere to the Futurist political party, even if they have no gifts at all for artistic or literary concepts.
+We will sustain this political program with the kind of Futurist courage and violence which have characterized our movement in theatres and piazzas everywhere.

Extracts from F.T Marinetti, *Manifesto of the Futurist Party (1918)* (Rainey et al 2009:247-251)

University of Cape Town

23. Women Futurist artists were a significant force within the Futurist movement, counting among their ranks the writers Maria Goretti, Dina Cucinni, Maria Franca Cornelli, Sibilla Alleramo, and Benedetta Cappa and the painter, sculptor and dancer Valentine De Saint-Point (Berghaus & Saint Point, 1993:27).

contribution to modern art movements has not always been fully appreciated despite, for instance, the acknowledgement of Hans Richter (one of the founders of Zurich Dada) that Dada had taken on all of the Futurists' ideas and "had swallowed up Futurism, bones feathers and all" (Richter 1965:34).

Futurist studies did receive a boost in the 1960s, (for which Marilyn Martin has received much credit)[24] and as a consequence the Fluxus movement of the 1960s and 1970s in America was strongly influenced by Futurist ideas. The centenary of Futurism's founding has seen another revival in interest in the movement with many previously unpublished documents being uncovered, published and studied. Along with this, major block-buster exhibitions celebrated the centenary. These included a re-staging of the Futurists' international "exhibition to the public" at the Centre Georges Pompidou in Paris in 2008 and the Tate Modern in London the following year.[25] In 2009, an exhibition of many original Futurist publications was presented at MoMa in New York, and readings of Futurist manifestos, poetry and concert performances using reconstructed *intonarumori* were given at SFMoMa in San Francisco. Somewhat unfortunately, though in keeping with its contradictions and complexities, Futurism's centenary celebrations in Italy were dogged by curatorial disputes (theartnewspaper, 2009).

For all its controversies, contradictions and complexities, both past and present, the Futurist movement remains, for me, a fascinating period of modernist history, and the ideas and works of the Futurist painters have provided a rich and constant source of inspiration for my project over the past two years, as I will discuss in the following two sections.

University of Cape Town

24. According to Rainey, Martin's *Futurist Art and Theory, 1909–1915 (1968),* was "The first comprehensive history of pre–World War I Futurist art to be published in English, and still an excellent source of information" (Rainey, 2009).
25. Remarkably, 30 of the original 34 works were shown as part of this exhibition.

3. *IDÉE SENSORIALI*

The Futurist painters had many ideas on how painting could be different - on where painting could go in the future - ideas contrary to everything that had gone before as a matter of principle! They eventually extended these ideas to sculpture, music, film, theatre and fashion. I have so far discussed four of these ideas and examined how these were expressed in the Futurist painter's work. I now return to their ideas looking at how these can be extend beyond the visual and review them in relation to multi-sensory art. In this section I present examples of where these ideas appear in the works of contemporary artists and I also explain how I adapted these Futurists' ideas to create multi-sensory art in my own experimental works.

A time will come when the picture will no longer be enough. Its immobility will become an archaism with the vertiginous movement of human life. The eye of man will perceive colours as feelings within itself. Multiplied colours will not need form to be understood and paintings will be swirling musical compositions of great coloured gases which, on the scene of a free horizon, will move and electrify the complex soul of a crowd that we cannot yet conceive of (Boccioni quoted in Coen, 2008:55).

The sensorium is a recurrent theme throughout the Futurists' writings and paintings. In Cara's *The painting of sounds, noise and smells (*1913) he writes "We Futurists attest that we are opening fresh paths in bringing the elements of sound, noise, and smell into painting". Similarly when examining Boccioni's paintings *Visioni simultanee (Simultanous visions)* (1911), *La strada entra nella casa (The street enters the house)* (1911) and *Materia (Matter)* (1911) vision, hearing and touch are found at their very centre.[26] Yet, despite their ideas on how painting might be transformed, and their impulse towards the sensorium, certain aspects of Futurist paintings remained both traditional and occulocentric. So while Russolo's *Perfumo (Perfume)* (1910) and *Musica (Music)* (1911-12) take up the subject of smell and sound, it is the visual representation of the olfactory and auditory that are sought. In fact, it was only around 1915 that Balla (with Depero) began some experiments with "plastic complexes" which ventured beyond the visual. However by 1915 *il Primo Futurisma* was almost over and by 1916, of the original *gruppo dirigente de pittura* (the painter's management team), only Balla continued as a Futurist - Boccioni had been killed in the war, and Cara, Severini and Russolo had all abandoned the movement (Rainey, 2009:28).

Balla first began by studying the speeds of cars, discovering their laws and essential force-lines [...] he came to see that the single plane of the canvas wouldn't enable one to give the depth necessary to capture the dynamic volume of speed. He felt the need to make new constructions with iron wires, cardboard planes, fabrics and tissue paper, etc., the first dynamic plastic complex (FRU, 1915).

University of Cape Town

26. I discovered that the ear is exactly in the center of *La strada entra nella casa,* and the eye and the hands are at the exact center of *Visioni simultanee* and *Materia* .

There has recently been much interest in the senses and sense-based art (Diaconu, 2006, Howes, 2007, Jones, 2006, Jutte, 2005, Montero, 2006). Zangwill has pointed out that while æsthetic response is mediated by the intellect, direct sensory experience is a necessary requirement for appreciating the æsthetic properties of a work of art (1998:66-79). It is thus perhaps not a coincidence that there has also recently been a revival of interest in the field of æsthetics (Gross, 2002, Halsall, Jansen & O'Conner, 2009)

Kant sought to transcend the dualism of vision and hearing and replace it with a fundamental division between the "arts of space" (e.g. painting) and the "arts of time" (e.g. music), accessible to "outer intuition" and "inner intuition" respectively. It could be said that Kant rarefied æsthetics by divorcing it from perception and substituting intuition. After Kant, æsthetic judgement would be properly neutral, passionless and disinterested. This definition of æsthetics guaranteed the autonomy of the enclave now known as "art" but at the expense of sensory plenitude (Howes, 2005:246).

As noted earlier, it was during my research into the senses and sense-based art that I discovered the writings of the Italian Futurist painters, and I became interested in their ideas. After I had decided to "revisit the future", I presented my proposal to the staff and post-graduate students at Michaelis. Trying to explain one of the Futurists' concepts (simultaneity), I inflated a large yellow balloon. Then holding it in one hand, and taking a blue map-pin in the other, I superimposed the two. As expected, the result was not a green balloon-pin but a loud BANG! This crossover of sensory modalities (from the visual to the aural), succinctly demonstrated both the Futurists' principle and my idea of extending Futurist ideas into a multi-sensory art practice.

Some time later, I wrote a Futurist manifesto of my own, *Futurist painting updated technical manifesto* (FPT, 2011) (Appendix A), which proposes that

> Our voluptuous art will activate primordial and synæsthetic responses in the minds of our public [...] With our enthusiastic adherence to Futurism, we therefore declare: [...] that the painter must paint with every available material and technology that can be touched and smelled and tasted and listened to. The surfaces of our paintings shall henceforth act as the point of contact for our public's sensory experience. Our works shall become as electrodes reaching into our public's mind, stimulating neural activity and constructing new pathways of experience to our Futurist art.

Based, as it was, on MFP (1910) and FPTM (1910), the updated manifesto enshrined the Futurists' ideas of simultaneity and states of mind, multiplied sensations, lines of force, and the spectator at the centre of the painting. However FTP2011 required that paintings should go beyond stimulating the visual sense in order to convey their message and elicit an emotional response. Ways needed to be found

University of Cape Town

for paintings to be experienced with all the senses. Katharina Gross describes her paintings as “communication surfaces” (Gross, 2005), and this sums up what I had in mind when I wrote “our paintings shall henceforth act as the point of contact for our public's sensory experience”.

I began thinking of Futurist painting for the twenty-first century as the synthesis of the original Futurists' ideas and new media technologies based on present day understanding of the physiology of the senses and I began to investigate how this might be achieved. Unlike Gross' communication surfaces which are essentially visual, my FTP2011 stated that the communications channels must be extended across all sensory modalities. FTP2011 further required placing the spectator at the centre of the painting, something which I could best achieve by making paintings interactive. I decided to incorporate microcomputers and consumer electronics into my paintings to extend the multi-sensory communication capabilities I was after. I thus adopted “interactive, multi-sensory communication surface“ as my working definition of “painting” for my project. This definition, I believe, remains faithful to the Futurist painter's ideas and is in line with the philosophies of Bergson.

In what follows, I will briefly discuss contemporary art and my own practice with regard to images for the various senses, and how these operate both individually and collectively as multi-sensory (multi-channel) communication surfaces.

Katharina Gross, *One floor up more highly* (2010).

The sprawling and spectacular site-specific exhibition by German artist Katharina Grosse at MASS MoCA, “One Floor Up More Highly”,[...] proves to be a multifaceted installation, inviting myriad interpretations. This project, like most of Grosse’s large-scale installations, incorporates massive sculptural features that allude simultaneously to empirical space and an imaginative vista. Yet the artist’s primary means of expression is painting, and the thrust of the work is rigorously abstract. She employs painting’s illusionistic devices of light and shadow, and, with a subtle manipulation of other elements, suggests complex narratives. Over the past decade, she has developed a unique working method and a singular approach to painting that has taken the medium far beyond its traditional domain (Ebony, 2012).

The crisis of contemporary art is a consequence of two variables: the inadequacy of traditional art media to transmit information, and the inefficiency of the information they carry in regards to language, thought and action. I understand by "communication" the transmission and processing of information, as well as the technical mechanisms employed in transmitting and storing information. Thus, communication systems comprise both the craft of painting and the machine that reproduces or complements functions of the nervous system, the brain or human behaviour in the creation of artworks, reproducing them through an artificial organ (Cordeiro, 1997:33).

University of Cape Town

Visual images

The Futurists had extensively investigated the visual aspects of their ideas, but I felt there was still room for further exploration of the visual sensory modality. I begin with the idea of multiplying (visual) sensation. I have previously discussed how the Futurists had used Divisionism. This technique relies on the relationships between surrounding colours , and on "colour shifts" as the viewer's eyes move across a painting's surface (Shevell & Monnier, 2006:567-571, Webster, 2009:288).[27] It has been noted that the principals applied in Divisionism are the basis for digital display screens where small dots red, green and blue make up the image (Hayes, 1999).

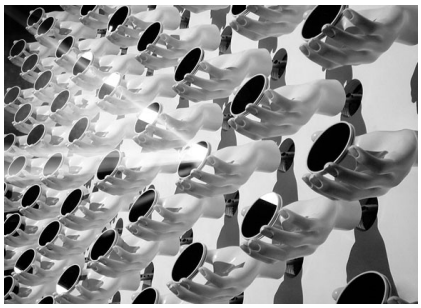
One of the discoveries since the time of the Futurists is that the human retina contains four types of ganglion cells[28] which specialise in detecting sharp edges, curvature of outlines, moving edges, and changes of light intensity (Moller, 2003:387). Thus any technique or combination of techniques that produce images with these characteristics will appear as enhanced sensations. So for example, in digital displays, contrasts and saturated colours can easily be adjusted to enhance sensation and create vibrant imagery as will any reflective surface or light emitting source if the contrasts in light coming to the eye are increased – for instance when the intensity of light increases. Fluorescent paint, which Gross uses in many of her works including *One floor up more highly* (2010), offers one way of achieving this.[29] The eye would also be more sensitive to paintings containing "hard edge" forms of the kinds the Futurists had started to produced intuitively and it follows that the eye would be sensitive to movement, which explains why people are immediately attracted to a television screen when they enter a room.

Jean Tinguely, *White moving forms on black background* (1957).

University of Cape Town

27. Monnier and Shevels' research on the underlying physiological effects shows that this results from neural "antagonism" from the retinal S-cones (2008:1-7) S-Cones are sensitive to Blue light. The L and M-Cones to red and green respectively. The optical phenomenon occurs when the angle between two coloured areas becomes less than 0.15 degrees. This helps explain why colours appear to shimmer and change the closer you get to them, for example, Seurat's *Sunday afternoon on the island of the Grand Jatte* (1884).
28. The retinal ganglion cells collate the inputs from the photoreceptor cells – the cones and rods- and pre-process the inputs before passing the resultant information on to the optic nerve (Moller, 2003:403).
29. With florescent (Day-Glo) paint (which had not been invented until 1934), a more intensive effect is produced by the absorption of "black light" (ultra violet), which is re-emmitted in the visible spectrum. The overall luminosity generally exceed that of pure reflection even in daylight, allowing greater contrasts to be created.

While movement is achievable in film and video, (and there are countless artists working in these media today) it has been achieved in other types of two-dimensional works as well, as for example in Jean Tinguely's kinetic painting *White moving forms on black background,* (1957) where separate geometric forms on the painting's surface are motorised. Julio le Parc's *Continuous mobile forms in contortion* (1968) is another example that uses rotating stainless steel "ribbons" mounted close to a painted surface. More contemporary works such as Daniel Rozin's *Wooden mirror* (2008) use computers and servo-motors to activate the tilt-able tiles making up the surface, which reflect a different intensity of light depending on their angle and create a moving image. ART+COM used rotating prosthetic hands arranged in a plane to created a moving image of reflected light for *Mobility* (2010).



ART+COM, *Mobility* (2010).

The idea of simultaneity and inter-penetrating (visual) planes also finds contemporary relevance in installations and public artworks where light is projected over existing visual surfaces. Krzysztof Wodiczko's socially charged projections onto monuments and buildings have included the projection of a swastika onto South Africa House, London (1985) and the projection of victims hands onto the A-bomb memorial for *Hiroshima Projection* (1999). Wodiczko's *Hiroshima projection* helps remind us that the Futurists' naïve belief in "glorious science" and their glorification of war could have devastating consequences.[30]

Krzysztof Wodiczko, *Hiroshima projection* (1999).

Julie Mehretu, *Excerpt (Suprematist evasion)* (2003).

Turning to contemporary abstract painting, there are a surprising number of painters who make works which could be considered to consist entirely of "lines of force". While these artists are not necessarily referencing the Futurists, the linear marks seem to have the distinct effect of bringing the viewer into the action of the painting in the way that Carrá's *Funeral of the anarchist Galii* (1911) does. Examples of linear works, which I believe work in this way, include Julie Mehretu's *Excerpt (Suprematist evasion)* (2003), Chris Finlay's portraits of political power such as *McCain Obama (*2008) and Matthew Ritchie's *The hierarcyhy problem* (2003), a network of linear forms which spiralled up the walls of the New York Guggenheim - in what can only be described

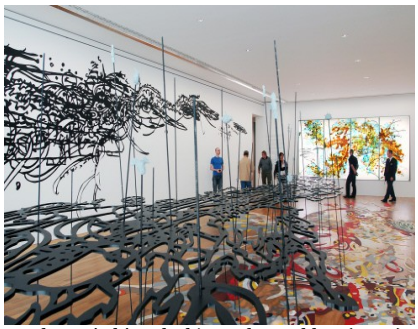
Chris Finlay, *McCain Obama (*2008).

30. In my updated manifesto *FPT2011* "the triumphant progress of science" gives way to "responsible science".

University of Cape

as a “force field”.

Lines of force in paintings can sometimes be quite subtle and yet still convey energy. The impact of works by Herbert Brandl come from the rapid gestural marks he makes on his huge canvasses. Referring to these (all untitled) paintings, Robert Fleck writes “Brandl is interested in a very special notion of space – one that has much to do with pulsating forces” (2007:10).


Matthew Ritchie, *The hierarchy problem* (2004).

This idea that a painting can produce a real “feeling [of] the motion in their own bodies”, as I have suggested in the previous section, is supported by art historian David Freedberg and neuroscientist Vittorio Gallese.[31] Freedman and Gallese propose that there is “a sense of inward imitation of the observed actions of others in pictures and sculptures” (2007:197).[32] Indeed there is a growing body of scientific evidence to suggest that the Futurists (and Bergson) were correct to believe that lines of force create both real dynamic sensations and altered “states of mind”. If this is so then even the gestural marks in abstract expressionist “action-paintings” such as Jackson Pollock's *Lavender Mist: Number 1* (1950) or Lucio Fontana's slashed canvases (*tagli)* such as *Spacial Concept: Waiting* (1959)[33] would be physically felt in the body of the spectator.

Herbert Brandl, *Untitled* (2009).

Lucio Fontana, *Spacial concept: Waiting (1959).*

Enhanced sensation and lines of force are not the only Futurist ideas that are found in contemporary art practice. The idea of the spectator at the centre of the picture seems to have become the goal of so-called “immersive environments”. Sculptural installations such as Thomas Hirschhorn's *Crystal of resistance* (2011) allowed the viewer to navigate a space crowded with shiny objects (although you weren't allowed to touch). A gallery completely filled with large paintings such as Gerhard Richter's *Cage series* (2007) or a space containing paintings that extend over the walls, floors and ceilings such as Gross' *One Floor Up More Highly* (2010), created with industrial spray painting machinery, also all provide visual immersions[34].

University of Cape Town

31. This follows from the so-called “mirror neurons” which were discovered when macaques in a laboratory, watching researches perform certain actions, showed neural activity mimicking the those actions. This neural activity was the same as if the macaques were physically performing the actions themselves (Winerman, 2005:49).
32. While the details of this conjecture remains contentious, there is growing evidence to support the view that motor neuron activity increases when subjects view still photographs of dynamic actions compared to static poses. (See Gallagher, S . æsthetics and *Kin* æsthetics. Forthcoming in J. Krois & H. Bredekamp (ed.) *Sehen und Handeln*. Berlin).
33. The title of this particular work refers to Boccioni's *States of Mind III (Those who wait)* (1911).
34. Immersive painting environments are of course not new. Michaelangelo's ceiling and wall frescos for the *Cistine Chapel* in Rome and the Rothko's paintings which cover the walls of the Rothko Chapel in Houston, Texas, are just two of many such historical examples.

In some of my own experimental paintings, in order to multiply sensations and to create simultaneity and inter-penetration, I emulated the Futurists' hard-edge and curved-outline forms adding to the visual sensation by using movement and varying the intensities of light. In one painting I embedded an LCD screen which displays moving, inter-penetrating hard edged-images. These images are computer generated and respond to the viewer's movement. In another painting, which lies on the ground, I chose to work directly with coloured light itself. Using multiple RGB light-sources coming from different angles so as to superimpose on one another on the reflecting surface, and with the shadows cast by the viewer, I set out to achieve inter-penetrating forms in all of the primary and secondary colours – a palette often favoured by the Futurists. The viewer's cast shadow from their own movements and from the switching of lights also causes movement of the visual image. In another painting I project computer generated video onto a white textured surface to create intensified sensation by intensified light and movement. I have also used fluorescent paint with ultra-violet illumination with some paintings to create areas of sharper contrast. In one painting I used disposable-camera flash-units to create an intense illumination of parts of the surface, producing an "after image" as its sensation. Gallery lighting is an integral component in creating the visual images for my work. In one case it is the intensity of the shadow that is detected to establish the viewer's presence and proximity to the work in order to animate it. Cast shadows become part of the painting producing moving and dimming areas of illumination and at the same time help place the spectator in the centre of the picture.

Whereas the representational tradition, (from Renaissance painting to cinema) splits the viewer's identity between the physical space, and the space of the representation, simulation (from the mosaic and fresco to VR) places the spectator in a single coherent space encompassing the physical space and the virtual space that continues it (Hansen, 2004: 40).

University of Cape Town

Aural (sonic) images

The simultaneity/superimposition and states of mind that the Futurists were after can be achieved aurally as well as visually and can be explained in terms of the abstract image of music. Polyphonic music, which dates back at least to the middle ages, is a musical form of simultaneity with multiple melody lines being played (or sung) at the same time creating overlapping notes or "chords". In modern synthesised music, "granular synthesis" achieves a similar effect creating

The sound experience which I prefer to all others is the sound of silence, and the silence almost everywhere in the world now is traffic. If you listen to Mozart or Beethoven, you see it is always the same, but if you listen to traffic, you see it is always different (Cage, 1991).

interesting synthetic sounds by rapidly alternating computer generated pure tones (grains) (Opie, 2003). Furthermore, music is experienced as "states of mind" because sequences of notes or chords are held in memory and build up tension, changing the listener's emotional state until they are resolved.[35] The aural sensations that result in "states of mind" are exploited by some contemporary musicians and sound artists including David Moss whose installation *23 ways to remember silence – only one way to break it* (2011) deals specifically with the mixing of memories (states of mind) (kunstradio, 2012).

Let us wander through a great modern city with our ears more alert than our eyes and we shall find pleasure in distinguishing the rushing of water, gas, or air in metal pipes, the purring of motors that breathe and pulsate with indisputable animality, the throbbing of valves, the pounding of pistons, the screeching of mechanical saws, the jolting of trams on their tracks, the cracking of whips, the flapping of curtains and flags (AON, 1913).

Today most videos, films and installations which include sound use either stereophonic or surround sound.[36] However both of these techniques require the listener to occupy a privileged position and not to move around. Many sound-artworks, by contrast, use multiple sound sources to create more complex soundscapes where listeners experience different sounds as they navigate the installation. Bill Fontana works in this way, creating what he calls "sound sculptures", exploring concepts of acoustic memory, and the interpentration of sound. In *White sound: An urban seascape* (2011), Fontana re-projected from the Wellcome Collection building in central London, a live sound stream collected along the Dorset coast.

The spontaneous emergence of forms through the free handling of paint is paralleled musically by the way in which formal, idiomatic and/or traditionally functional elements occur in freely improvised music [...] The intensity of the interactions between the artist and medium and the dynamic of emergent qualities represent the central focus of both art forms [...] characterized by the exploration of the relationships between order and disorder...The primary purpose in both visual and aural contexts is the transcendence of conventional physical, artistic and cultural boundaries imposed by traditional materials/instruments and procedures (Sansoms, 2001:30).

For some of my paintings I wanted to achieve inter-penetrating sound-images analogous to the inter-penetrating visual forms of a Futurist painting. Unlike Fontana's sculptural approach, I wanted numerous distinct sounds to be emitted directly from different areas of the painting's surface. These would be discernible as separate auditory streams (or felt by touching the vibrating canvas). I wanted the sounds to change as if the listener had entered different rooms of an apartment – an effect that is very different from the stereo or surround sound images.

To achieve this inter-penetrating two dimensional sound-scape, I stretched canvases over rigid supports. I then mounted speakers and physical objects directly onto the back

University of Cape Town

35. Bergson used the music analogy of tension and resolution to explain psychic duration (Bergson, 1889:100).
36. High-fidelity stereophonic sound (using two locations for speakers) simulates the concert-going experience, and is two dimensional, whereas surround sound (5.1 or 7.1) using 6 or 8 speaker locations) is three dimensional. Our bi-aural sense allows us to pinpoint the direction of sound and we verify this by making slight movements of the head – our brain automatically detecting the intensity and time differences detected between left and right. With stereophonic sound recordings we can only get a sense of left, right and center, whereas with 5.1 or 7.1 surround sound, we get a sense of being surrounded.

of the supports so that the painting's surface would act as the resonator. When activated by the presence of the viewer , either pre-recorded sound tracks are played back or sounds are produced *ex tempore* by electronic or mechanical devices.

Haptic images

Touch is one of the most powerful and intimate forms of communication, one whose practice is regulated in all societies (Finnegan, 2005:24). Touch affirms reality. "The disembodied sense of vision is rooted in and dependent on touch for its reality-conferring affective correlate" (Jonas 1982 quoted in Hansen, 2004:37). Touching other people, animals and inanimate objects establishes both a physical and emotional connection between toucher and touched.

A few years ago, after I had hung one of my large abstract paintings for a group exhibition, a friend (also an artist) came up to me and asked "Is it dry? Can I touch it?" Then, as I nodded my approval, she reached out her hands, closed her eyes, and slowly ran her fingers down the length of the painting's surface from top to bottom.

While I have noted that paintings are accessed primarily by vision, they are also inherently haptic. The haptic image is a natural outcome of the materiality of paint and the painting process – the way the paint accumulates in ridges and the way it splatters can reveal the actions of the painter and can be felt as lines of force as discussed earlier. Paintings with heavy impasto can be found throughout western painting tradition with well known examples including Rembrant van Riijn's *The Jewish bride (c1665)*, Lucien Freud's *Self portrait-reflection (2002)* and Frank Aurbach's *J.Y.M Seated IV* (1992) to name a few I have personally inspected at close quarters.[37] Ironically, when Marinetti introduced *Tactilism* (the art of touch) as a new Futurist art form, he made it clear that this had nothing at all to do with painting.

Much has been written about "haptic visuality", which is the way textured images are perceived (Marks, 1999 :162-164) but this is not the same thing as I am calling a "haptic image" as the counter-example of Glen Brown's *trompe l'oeil* versions of impasto paintings well demonstrate (Grossenick,

Unextended sensations of touch and of the other senses give, by their synthesis, the idea of a material object (Bergson, 1896:47).

Touch brings to the blind many sweet certainties which our more fortunate fellows miss, because their sense of touch is uncultivated. When they say they look at things, they put their hands in their pockets. There is nothing, however, misty or uncertain about what we can touch. I know faces of friends, the illimitable variety of straight and curved lines, all surfaces, the exuberance of the soil, the delicate shapes of flowers, the noble forms of tree, the range of mighty winds. Besides objects, surfaces and atmospheric changes, I perceive countless vibrations (Hellen Keller (1933) quoted in Classen, 2005:24).

Paint records the most delicate gesture and the most tense. It tells whether the painter sat or stood or crouched in front of the canvas. Paint is a cast made of the painter's movements, a portrait of the painter's body and thoughts ... All those meanings are intact in the paintings that hang in museums: they preserve the memory of the tired bodies that made them, the quick jabs, the exhausted traces, the careful nourishing gestures (Elkins, 2000:5).

37. On my visits to art-museums, I am frequently asked to "step back" as I instinctively reach out to touch the surfaces of paintings.

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2005:76).

In respect of the Futurist ideas I have been discussing, it seems obvious that the proximity of a tactile encounter with a painting, especially if it is on a scale larger than the human body, succeeds in placing the spectator at the center of the painting and "blending, so to speak, the painted canvas with the soul of the spectator" (ETP, 1912). Furthermore, touch is capable of revealing the superimposition of forms often left as traces of the painting process. This can be seen in Tomma Abts' *Folme (*2003) where it is not the visual image that reveals inter-penetrating hard-edged abstract forms but the haptic. Abts is concerned in her paintings with expressing how time is connected to space (Nickas, 2009: 231), an idea she shares with the Futurists . As Abts' hard-edge images evolve, the tactile "edges" of the geometric forms she has obliterated remain feintly visible, but tactilely distinct.

In many of my own works I created inter-penetrating haptic forms using both oil paint and encaustic. I found encaustic an ideal medium in this regard as it quickly builds up a texture that can be re-worked with modelling tools. I experimented further with the tactile perceptions created by different types of paint and supports. Oil, acrylic, encaustic, enamel and lacquer-spray each have a unique "feel". Encaustic, which solidifies but doesn't harden, feels different to the hard "prickly" texture that spray paint creates on raw canvas and encaustic painted by brush feels different to encaustic which has been smoothed by a heat gun and polished with a cloth, or scratched with a blade - just as thin layers of oil-paint feel different from impasto and as paint applied by brush feels different to paint applied with a palette knife. The haptic image can also be enhanced to multiply sensation. In one experiment I created a tactile image by using a staple gun to follow the outline of a drawing I had made on the back of a support. The staples which protrude through the "visual image", are barely noticeable to the eye, but are easily detected by touching the surface.

Frank Aurbach, *J.Y.M Seated IV* (1992).

Following from, and extending Bergson, contemporary media art has operated what amounts to a paradigm shift in the very basis of æsthetic culture: a shift from a dominant occulocentric æsthetic to a haptic æsthetic rooted in embodied affectivity. [...] the works [that contemporary artists] create might indeed be understood as efforts to specify what remains distinctly human in this age of digital convergence (Hansen, 2004:12).

Tomma Abts', *Folme (detail) (*2003).

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Olfactory images

The sense of smell, unlike the other senses, has direct links to the primordial brain (limbic structures) – this explains the remarkable ability of smells to invoke memories, emotions, and sexual and other bodily functions (Molller, 2003:427). In this respect, allowing an olfactory image to inter-penetrate the images of other sensory modalities, would not only allow for enhanced sensation and interpenetration of sensory stimuli, but would also affect the viewer's states of mind, triggering deep seated and personal recollections and emotional states.

Odours, unlike colours, for instance, cannot be named – at least not in European languages. 'It smells like...', we have to say when describing an odour, groping to express our smell experience by means of metaphors. Nor can odours be recorded: there is no effective way of either capturing scents or storing them over time. In the realm of olfaction, we must make do with descriptions and recollections." (Classen, 1994:3)

Paintings in the studio have a unique smell, often dominated by solvents (such as turpentine). But this smell wears off over time and if a painting is to produce an olfactory image there needs to be a specific mechanism for containing and releasing the smell. The olfactory images created by Sissel Tolaas for *the FEAR of Smell — the Smell of FEAR* (2006) were synthesised in a laboratory from the smell of the sweat of men, collected as they performed various stressful tasks. Sissel added smell to a neutral binder then painted it onto the walls of the gallery. Peter de Cupere, who works on olfactory installations and sculptures, has made a series of "paintings" using materials as diverse as soap and eggs. In *Scented kisses happening* (2010) he created a participative work where four hundred visitors (who had been given a limited edition lipstick in various colours), kissed a canvas perfumed with erotic fragrances and pheromones.

Sissel Tolaas, *the FEAR of Smell — the Smell of FEAR* (2006) , installation view.

In some of my experimental paintings I have used essential oils with encaustic as the binder to create an olfactory image. In one work I utilised small electric pumps and blowers to disperse household odours which I mix with pure alcohol to improve their fluidity and volatility. While it is difficult to imagine olfactory "lines of force", smells certainly have the effect of enhancing sensation, inter-penetrating one another and of placing the viewer at the centre, and quite literally allow the rendering of the surrounding atmosphere as *FPTM* (1910) suggested.

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Images of the lesser known senses

Aristotle, in *De Anima,* identified only five human senses - those which are most easily recognisable from the anatomical features of the body (Sorabji, 1971:55-79).[38] However there are many others. The somatosensory system, for example, contains receptors for touch as well as vibration, skin temperature and pain (Moller, 2003:186-188)[39]. Nine distinct sensory systems are frequently identified; vision (sight), audition (hearing), olfaction (smell), gustation (taste) and tactition (touch), together with the lesser known thermoception (the ability to detect hot and cold), proprioception (the sense of where our limbs and body are), nociception (the sense of pain), and equilibrioception (the sense of balance and rotational acceleration). While the last four senses are sometimes overlooked, they are important in art and to the understanding of æsthetics. Dancers use proprioception to evaluate their movements (Montero, 2006:231), and proprioception, equilibrioception and thermoception are important concerns for architects (Fitch, 1970: 86-94).

Proprioception and equilibrioception were given specific consideration in one of my works - a painting which lies on the floor and which is made of multiple, uneven (and wobbly) panels. I invite the viewer to be physically in center of the painting and to engage with their senses of proprioception and equilibrioception controlling their limbs and their balance, thus adding additional sensory modalities to their æsthetic experience of the work.

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38. Aristotle(384–322BC) in *De Anima* demarcated five senses and arranged them in a hierarchy with vision at the pinnacle, followed by hearing, smell, taste, and touch. (Jutte, 2005:61). This hierarchy permeated both philosophy and the arts. Greek philosophers favoured θεωρια (theorea), which is comprehension through (visual) observation. It can be argued that in Western culture, vision established a hegemony in the arts and philosophy (Levin 1993). Heraclitus (500BC) wrote that he most honoured sight, hearing and knowledge, although "the eyes are more exact witnesses than the ears" (Fragment 55). When the five "fine-arts" (painting, sculpture, architecture, music and poetry) were established during the Renaissance , they were delineated along sensory lines. The fine-arts included only those accessible to vision or hearing. The other arts were regarded as "useful arts", or crafts (Walker, 1994:7). Jutte notes however that both the categorization of senses and their rankings is a social construct which varies across cultures (2005:55-61). Hearing seems to predominate in non-literate/oral cultures, whereas for cultures like the Ongee of the Andaman Islands the most important sense is smell (Classen, 2005a:147-148,153). Recently sociologists and anthropologists have begun re-appraising sensual culture and the role of the senses in establishing cultural values (Classen, Howes & Synnott, 1994). Given vision's and hearing's dominant position, it was not surprising to find that the field of æsthetics gave little attention to the lower senses - at least not until recently (Diaconu, 2006 and Montero, 2006:231-232).Recently a new branch of experimental æsthetics (neuro-æsthetics) has appeared (Seeley, 2011) which deals with some of the concerns of the combination of æsthetics and the senses.

39. Sensory receptors connect via multiple pathways to both cognitive and non-cognitive areas of the brain and it would therefore be more appropriate to identify the senses in terms of variety of sensory receptors (photoreceptors, thermoreceptors and so on) or even in terms of their specialisation (such as the different types of photo-sensitive cones and the different types of chemically responsive olfactory receptors.

Synæsthetic images

It is common experience that the sense of taste is influenced by smell and, to a lesser extent, the senses of vision, touch and hearing.[40] A key insight into how sensations are influenced (and amplified) across senses comes from MIT's Media Lab where Russ Newman connected two identical high definition video screens and played the same video on each but used two different qualities of sound systems and speakers. Participants in the study judged the screen associated with the better sound quality to be of higher definition (Negroponte, 1995:125). It thus follows that the Futurists' idea of amplifying visual sensation could be achieved by stimulating one or more of the other non-visual senses.

To most people, my [synæsthetic] experience sounds like it would be too much information, all at once," she said. "But really there's just a harmony of everything. The key word is layers—layers of perception. There's never just one, but they're never all in your face (Marci Smilack quoted in – Hughes, 2006).

However it is not just the perceptions of direct sensory inputs that are affected. Within the cognitive areas of the brain there are, in many cases, a cross-over of sensory modalities which gives rise to synæsthesic responses such as "seeing" colours in response to smells, or "hearing" tones in response to colour (Gilbert, Martin & Kemp, 1996:335, Jones, 2006:216-219). I have discussed the Futurists' interest in synæsthesia in the previous section, but I should note that in the time of the Futurists synæsthesia was considered rare and often had metaphysical connotations. However synæsthesia has been shown to be a very real phenomenon, not just metaphorical or learned (Ramachandran & Hubbard, 2001) and is far more common than originally believed.[41] Thus any consideration of images and their perception by the senses should also take synæsthesia into account.

It has recently been pointed out that synæsthetes both make and experience art differently from those without these neural interconnections (Hertz, 1999, Hughes, 2006). Perhaps the best known artist-synæsthete was Wassily Kandinsky, who "saw" music as colour. Kandinsky referred to his paintings as "compositions" and "improvisations" and the opera he wrote, *Der Gelbe Klang ("The Yellow Sound")* (1912), was a true *Gesamtkunstwerk* celebrating his synæsthesia - a combination of colour, light, music and dance

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40. I am reminded here of Dr Suess' story *Green eggs and ham* (1960).
41. Originally thought to occur in only one in a hundred thousand of the population, the prevalence of synæsthesia has recently been found to be closer to four in a hundred (Rogowska, 2011). Interestingly, synæsthesia occurs more frequently in artists and poets and in left-handers and women (Cytowic, 1995).

(Cytowic, 1995). There are some artists today deliberately working with their synæsthesia. One example is photographer Marcia Smilack who takes photographs of scenes whenever she experiences them strongly as specific musical instruments or textures (Hughes, 2006).

Many artists have produced works which provide a form of artificial synæsthesia, ranging from the early colour-organs produced by Rimington in 1893 (Van Campen, 2008:51) to Brian Eno's & Peter Chilvers' ambient music iPhone apps *Bloom (2008), Trope (2009)* and *Scape (2012)*. In my own experimentations I have worked at creating an integrated sensory experience. In one of my works I provide viewers with the ability to "listen" to the colours and colour-variation on a paintings surface, while simultaneously running their fingers across the surface.

Immersive images and the body

I have thus far discussed the sensory modalities separately, and I have discussed the phenomenon of synæsthesia in relation to the Futurists' ideas, contemporary practice and my own experiments. However it is the sum of the senses (including synæsthesia) that give rise to perceptions and which constitute our experience of the world. Since we are endowed with exquisite sensory apparatus allowing us to discriminate between minute changes in intensity, detect small temporal and spatial shifts, and notice subtle qualitative differences across multiple sensory modalities (Moller, 2003:3-30), we should expect to use the senses more fully when we engage with a work of art.

I now turn to the body and to the multiple-sensory images in which it can become immersed. To expand on my definition of a painting as an "interactive, multi-sensory communication surface", I take the view, expressed by Hansen, that the medium is the "user interface" with which viewers interact in order to make their selection of images from the flux of information available, and furthermore, that it is the "affective body"[42] that both activates and responds to the medium (2004:128-130). Hanson claims that this embodied perception moves "not from the body to the frame,

All seems to take place as if, in this aggregate of images which I call the universe, nothing really new could happen except through the medium of certain particular images, the type of which is furnished me by my body (Bergson, 1896:3).

Digital convergence promises to render obsolete the now still crucial moment of perception, as today's hybrid media system gives way to the pure flow of data unencumbered by any need to differentiate into concrete media types. [...] And if the shock effect [of modernist art] relocates the impact of the work squarely in the domain of experience, this is all in the service of a redemption of embodied experience: a renewed investment of the body as a type of 'converter' of the general form of framing, into a rich singular experience. One might even characterise this properly creative role accorded to the body as the source for a new, more or less ubiquitous form of aura: the aura that belongs indelibly to this singular actualisation of data in the embodied experience. [...] On Bergson's account, the body functions as a kind of filter that selects, from among the universe of images circulating around it and according to its own

42. By affectivity Hansen means "the capacity of the body to experience itself as more than itself, and thus to deploy its sensorimotor power to create the unpredictable, the experimental, the new" (Hansen, 2004:2-8).

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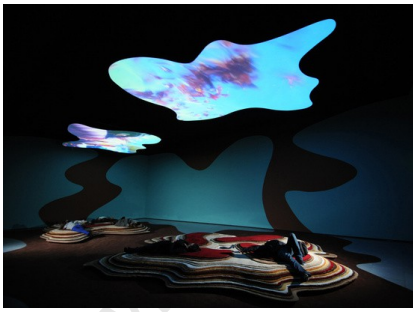
but from the frame (back) to the body" (2004:2-8).

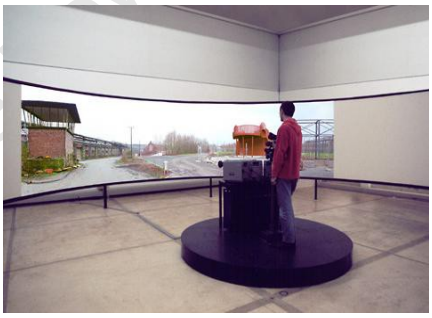
The body's role in selecting images from the medium is crucial in contemporary art installations which offer total immersion of the viewer. Pipilotti Rist's video installation, *Elixer* (2009), for example, allowed one to lie on piles of rugs listening to and looking at projections on the walls and ceilings (Arrel, 2009). Many installations which provide immersion are also responsive or interactive (Brouwer,2007). Responsive environments, as Bullivant notes, more closely align our environments to our senses (2006:6-17), and interactive environments ("virtual reality" or VR environments), respond to the viewer's actions allowing the viewer to become an active participant in creating the work. While interactive environments are by no means limited to digital media, computer controlled environments tend to dominate contemporary interactive-art practice primarily because of the flexibility of the software that controls these computers.[43] In these virtual spaces, reality becomes suspended as the senses are bombarded with artificially generated stimuli in the way imagined by Huxley in his "Feelies" in *Brave new world* (1932:35). Jeffrey Shaw's *EVE (Extended virtual environment)* (1993) and *Place-Ruhr* (2000-present) are interactive immersive environments using audio-visual images that appear to surround viewers as they control the projection platform, providing a panoramic image whilst highlighting the fact that this is virtual reality. One valuable consequence of digital media is that the spectator, at the center of the picture,often has a unique experience of the artwork – not in the sense that everyone has a subjective experience of the same reality – but in the sense of a never to be repeated reality which is digitally created. "We often have an audience the size of one", says Negroponte (1995:194).

All of my experimental works have been made to be interactive. In one of my works I created an immersive environment where the viewer is bathed in coloured light while the sound of their footsteps are amplified by the resonating surface of the painting as they dance or skip around on it.

embodied capacities, precisely those that are relevant to it. [...] [A]ffectivity actualises the potential of the image at the same time as it virtualises the body:the crucial element is neither image or body alone, but the dynamic interaction between them (Hansen, 2004:3-8,130).



Pipilotti Rist, *Elixer* (2009), installation view.



Jeffrey Shaw, *Place-Ruhr* (2000), installation view.

"Going to the Feelies this evening, Henry?" enquired the Assistant Predestinator. "I hear the new one at the Alhambra is first-rate. There's a love scene on a bearskin rug; they say it's marvellous. Every hair of the bear reproduced. The most amazing tactual effects..." (Huxley, 1932:35).

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43. An interactive environment becomes immersive when the viewers (now viewer-participants), begin to believe that what they are interacting with is real, and as Hansen notes "putting the body to work (even in quite minimal ways) has the effect of conferring reality on an experience, of catalysing the creation of a singular affective experience" (2004:39).

Images created by robots

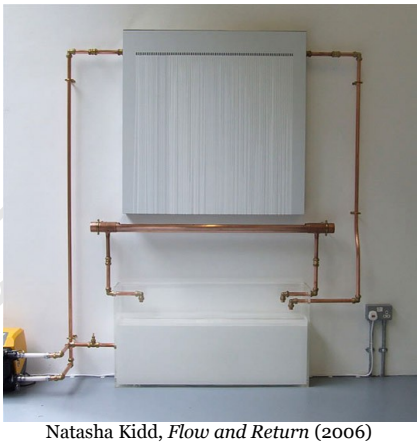
The Futurists' ideas lead them to other things; abstract painting, music and sculpture. In my project, the Futurist ideas which lead to multi-sensory and interactive paintings eventually lead me into robotic painting machines.

Cybernetic technologies, based on miniaturised electronics and even nano-technology, allow us to build intelligent machines. Currently robots vacuum homes, assemble and spray paint cars, welcome guests at conferences and perform a multitude of tasks that humans either cannot or do not want to do. Digital hardware and software technologies are at the heart of these robotic devices (Winkless,1984). What is significant for me is that robots, in order to be able to operate autonomously, must be equipped with some sort of sensory system which is used to direct their actions.

Technology seems to hold a fascination for artists.[44] Just as the Futurists were infatuated with the latest technologies of their day (the automobile and the aeroplane), so too are some contemporary artists fascinated by the technologies of robots. An early robotic artwork *Robot K-456* (1964) was created by Nam June Paik and Shuya Abe.[45] Today some artists use industrial robots, such as those manufactured by KUKA,[46] in their projects. For example Robotlab's (Matthisa Gommel, Martina Haitz and Jan Zappe) *The well-tempered robot* (2005) uses the noises of the motors and other mechanical parts to play recognisable classical music.

Sophisticated electro-mechanical devices that can create paintings have been around for a considerable time – Jean Tinguely's *Méta-matics* series of machines (1958-9),[47] are well known examples. Natasha Kidd's *Painting machines* (1998 – 2005) dip canvasses into paint and *Flow and Return* (2006) pumps paint over canvases and then re-circulates it (artbathspa, 2012). Harold Cohen's *Aaron* (1978 – ongoing), is an example of a computer controlled painting machine. *Aaron* has been programmed to produce paintings by reproducing Cohen's own æsthetic ideas and painting

Jean Tinguely, *Méta-matics No 9* (1958).



Natasha Kidd, *Flow and Return* (2006) installation view.

I love paint straight from a can, the smell, sound, what it can do [...] I stayed in the Lowry wrapped in a blanket overnight. We'd been plumbing for days and days and I just couldn't bring myself to leave it" (Natasha Kidd quoted in Sethi, 2006).

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44. Some artist celebrate technology. Others use technology in making ironic self-reference.
45. *Robot K-456 is* not actually a robot but rather a remote controlled "humanoid" machine. I prefer to use the term "machine" to mean mechanical or electromechanical devices in general , whereas the term "robot" only if the machine is able to operate autonomously.
46. KUKA (Keller und Knappich Augsburg) is a German company that has been around since the time of the Futurists. Today it is one of the world's leading manufactures of industrial robots (KUKA, 2012).
47. Tinguely's *Méta-matics* were based on mathematical Lissajous figures - the superposition of different harmonic oscillations. Lissajous figures result in stark geometric images with pretty Moiré-effects, as seen in early computer-generated graphics. However, the imperfections in Tinguely's machines created interesting variations (radicalart, 2012).

techniques. Ben Grosser's interactive painting robot, on the other hand reacts to ambient sound. It recently collaborated in a multidisciplinary performance with a cellist in *Head swap* (2011) (Grosser, 2012).

In my own experiment with *Autoritratto*, I created a painting robot which uses a number of different sensors to see, hear and smell the viewer in order to make a painting of them.

Towards the sensorium

In discussing the senses and multi-sensory art, I have shown how Futurist ideas have been addressed within specific sensory modalities by contemporary artists, and I have discussed how I have experimented with sensory images within my own art-making practice. I have also alluded to the sensory capabilities of robots – sensory systems being one of the factors distinguishing robots from other electro-mechanical machines. I have further discussed how it is the body interacts with the work of art and is able to be immersed in multi-sensory images.

In the next section I describe how, in my own project, I made paintings for a combined sensory experience - moving from the Futurists' occulocentric ideas to an interactive, multi-sensory communication surface whilst retaining the ideas of enhanced sensation, simultaneity, lines of force and the viewer at the center of the picture.

What emerges from an analysis of rock art and the non-visual is that engraved and marked rocks are not just representations of San æsthetic and shamanistic practices - they were active participants in those practices. Rock engravings were hammered, rubbed, cut and flaked to produce sound, sensation and to deepen personal and community relations with potent images and places (Ouzman, 2001:237-251).

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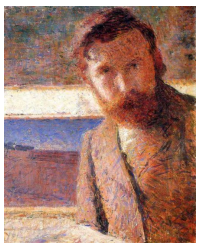
4. RITRATTI

Having discussed Futurist ideas and multi-sensory images from the perspective of contemporary artworks and my own practice, I now turn to my experiments in detail. As described earlier, my own manifesto, FTP2011 (an update of the original Futurist painters' manifestos of 1910) provided the theoretical framework for my project and my methodology, going from idea to exploration, mimicked the methodology of the Futurists.



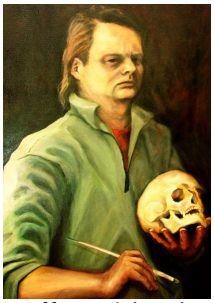
Balla, *Autoritratto* (1902).

Boccioni, *Autoritratto* (1905-06).

Carrá, *Autoritratto* (1951).

Russolo, *Autoritratto* (1909-10).

Severini, *Autoritratto* (1912-13).



Self portrait (2004).

As a foil for my experiments I chose to make portraits of the five Futurist painters. I wanted the opportunity to both focus on each of the painters individual ideas and interests and to contrast them with the ideas of the others of the group. Portraits served this purpose well. Painters make careful studies of their sitters in order to portray certain features of them, and a good visual likeness is not necessarily the most important consideration. In my case, I aimed to capture an abstraction of the five Futurist painter's ideas. So, while I collected images of Balla, Boccioni, Carrá, Russolo and Severini as reference material, read as widely as I could about them and their theories and looked at hundreds of their paintings, drawing and sculptures in galleries or as reproductions in books, I followed their advice: “a portrait, in order to be a work of art, must not resemble the sitter [...] To paint a human figure you must not paint it; you must render its surrounding atmosphere” (FPTM, 1910).

Since each portrait was planned as a different experiment in extending the Futurists' ideas, I chose to use a number of different materials, new-media technologies and painting styles in each work. It is evident when reviewing the Futurists' works that their own experiments produced great variety, and my own “portraits” turned out to be similarly eclectic. The last work in the series of experiments is an abstract self portrait. Just as the other portraits focus on individual painter's ideas, so *Autoritratto* presents a synthesis of the Futurists' ideas that I had investigated in combination with the ideas of my own.

I will discuss the five portraits and *Autoritratto* individually in more detail later in this section. However, I first discuss some of my project's constraints.

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Constraints

There were a number of constraints placed on my experiments. Some of these were self-imposed in order for my project to adhere to the theoretical ideas that I had published in FPT2011 (in accordance with my chosen methodology), some constraints were due to technical concerns, and some were merely to limit the scope of my project at this particular juncture.

One self imposed constraint was that my "communication surfaces" should be flat - unlike those of Katharina Gross, whose paintings often cover shaped polystyrene blocks, piles of sand and architectural forms . I took the stance that, in contrast to sculpture, two-dimensionality (the picture plane) sets up a particular dynamic in the way the viewer perceives the image(s) which effects a particular æsthetic response.[48] Furthermore if the two dimensional image is made to be both multi-sensory and interactive, the space between the viewer and the picture plane takes on new significance. For instance, the two spatial dimensions of the visual image may be augmented by either a temporal dimension (moving images and sound) or a sensory dimension (sound, smell, touch and so on), or a combination of the two. This contributes to the enhanced sensations and altered emotional states of mind that the Futurists sought in their paintings, and ultimately will help place the viewer at the center of the picture.

My initial experiments began on rectangular supports (board covered with canvas) which were designed to be hung on walls. I later extended my paintings onto the gallery walls or onto the floor. These became my communication surfaces - the "point of contact for our public's sensory experience" as required by my FPT2011.

I choose deliberately to restrict my materials – limiting them to a combination of modified consumer-electronics and various types of paint.[49] For the consumer-electronics, I placed the further constraint that the cost of any single item was to be no more than that of a small tube of artist-quality cadmium-red oil-paint. I was determined to work as a "painter" using the electronics as "paint", and utilising the painting's support as my circuit boards. In line with this idea, I further adopted the practice of doing everything myself using only hand-tools. This included designing and assembling all the

48. Technically, all paintings are three dimensional, not matter how thin the support or how smooth the layer of paint.
49. A few other materials crept in during my project, just as they had in the Futurist's collages or in Balla's "dynamic complexes". However, apart from additional materials used for supports (aluminium, PMMA (Perspex) and ply-wood) and the materials used to create physical noises (an assortment of kitchen utensils, crockery, glasses, tin cans and a car hooter), I was happy that I had stuck to my constraints.

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electronics and repairing a few dysfunctional laptops from which the working components were stripped and functional units created. The only exception to this rule was the manufacture of the PMMA (Perspex) panels for *Autoritratto* which I contracted out.

In choosing to use various types of conventional paint, there were two considerations: The first was to allow the viewer the experience of touching the surfaces of paintings. Whilst being aware that many artists such as Karla Black have used all sorts of painting materials - eye shadow, toothpaste and other household items, as for example in *At fault* (2011), I needed my surfaces to be resilient enough to touch. The second consideration was so that I could experiment with paints that would carry scented essential-oils in order to make an olfactory image.[50] To this end, I tried using encaustic in some of my works. Being made from beeswax and resin, encaustic has an inherent scent that is long lasting,[51] but this provides only a single olfactory dimension and I required specific smells. Noting that encaustic solidifies rather than oxidises and can "carry" up to ten percent of its volume in oils (Doerner, 1921:123),[52] I experimented with blending essential oils into the encaustic. I learned that, apart from some slight yellowing particularly with pepermint and citrus oil, encaustic is reasonably successful in holding smells over periods of up to a month. However I discovered that after a time the surface needs to be scratched before even small traces of the scent are released. Embedding sweet, salty, sour and bitter substances into encaustic to produce a gustation (taste) image would have been practical in my project as these can easily be added when the encaustic is still in a molten state. Since many chemicals (such as salt and sugar) are stable, these will remain on the surface for an extended period and can be tasted. The problem here is that allowing viewers to lick the "painted" surface or even to lick their fingers after touching carries a health risk – and so I excluded this one sensory modality (gustation) as a practical constraint (at least for now). In the end, all of these constraints, while sometimes posing problems, helped me to focus on my chosen options in greater depth. In what follows I provide details on the construction and the ideas behind each of the five experimental portraits and the *Autoritratto* I produced.

"Due to the fragile and volatile nature of the work, we kindly ask you to be extremely cautious not to damage the art as you move around the exhibition", warns a hostess at the entrance of the Scottish pavilion [at the 2011 Venice Bienale] (D'Elbée, 2011).

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50. Tolaas Sissel used paint as the scent carrier in her *FEAR* work, but then again she is employed by the laboratories of International Flavors & Fragrances, the multi-billion dollar organisations behind many of the best known perfumes and foodstuffs, whom I'm sure helped her out.
51. Bees are able to detect this scent over long distances. Whenever I worked with encaustic and the studio windows were open, bees would appear and buzz around my palette.
52. The problem with adding essential oils to oil-paint is that oils "dry" by oxidising, and most oils (aside from linseed, poppy seed, safflower and walnut) either do not oxidise within a reasonable time, or are not sufficiently clear to use in combination with pigment (Doerner, 1921:123). I had learnt to make my own oil paint and knew that essential oils cannot successfully be carried by them.

Ritratto di Balla

Giacomo Balla (1878-1951) was the oldest of the Futurist painters and, based in Rome, was initially less active than the others in the Futurist movement, although he was a signatory to the painters founding manifestos of 1910 (Martin, 1968:73). None of his works were shown in the 1912 exhibition![53] His extensive 1912 experiments with light and movement were conducted methodically, and his resulting works, which show little influence from the others of the group, became highly regarded as examples of Futurist painting (Lista, 2001:80).

My *Ritratto di Balla* presents an unprimed canvas painted with gestural marks in unpigmented wax. My aim was to create a tactile surface, so that lines of force can be physically felt as well as seen. Since Balla was particularly interested in the effects of light, colour, rhythm and movement, the unpigmented wax allows projected colours to move freely across the surface. The wax lines form a rhythmical pattern that is derived from Balla's *Lines of movement and dynamic sensation (swifts)* (1913).

For the projection I created swooping bird-like objects that leave in their wake an image similar to Marey's chronophotographs of birds. As the viewer gets nearer, the image begins to change into an abstract form - the closer one gets, the more complex the patterns become until the image is a chaotic pulsating mass of complimentary colours – augmented by the whine of a jet turbine and a whiff of jet-fuel.

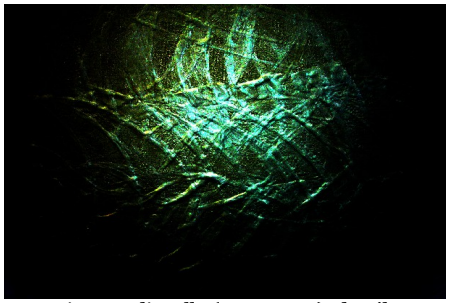
At the base of the painting I placed an ultra-sound range-finder, which scans the area in front of the painting, measuring the distance to the viewer. As the viewer moves within range, the volume of the recorded sounds swell up and the viewer is caught in the beam of the projector; the shadow, cast over the surface, places the viewer in the center of the image. Two independent sound sources are used to present a recording of the auxiliary power unit of a passenger jet aircraft and a flight safety announcement which is played from speakers embedded behind the surface of the painting.

The bird like objects in the projected visual-image are dynamically generated by the computer making use of the VVVV toolkit.[54] These forms were created using graphics

We shall give flesh and blood to the invisible, the impalpable, the imponderable, the imperceptible. We shall find abstract equivalents for all the forms and elements of the universe, then combine them together according to the whims of our inspiration in order to create plastic complexes that we will put into motion (Balla, FRU, 1915).

Marey, *Chronophotograph* (c.1882).

Balla, *Lines of movement and dynamic. sensation (swifts)* (1913).



Ritratto di Balla (2011-2012), detail.

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53. Balla's works are listed in the catalogue for the 1912 exhibition, but the group dissuaded him from exhibiting as his works were not considered sufficiently Futuristic. This situation changed completely after 1912.

54 VVVV is a multi-purpose software package (toolkit) for creating and interlinking computer related media such as audio, video, and

technology similar to that used in computer games and 3D animations. What you see projected are the wave forms of these virtual 3D objects moving through a simulated dense medium – where the density and the speed of propagation depends on the distance of the viewer as measured by the range finder.

The chaotic image that eventually emerges is the result of merging each image frame with its predecessor, creating a feedback loop. Small variations in the initial conditions (which depend on the exact moment the viewer enters the space) give rise to an unpredictable pattern, unique to each viewer.

The tactile image *Ritratto di Balla* focuses on the ideas of lines of force and the visual image presents both simultaneity and lines of force using Balla's method of repeated images and rhythmic lines. The transitions from figurative to abstract imagery references Balla's move towards pure abstraction. The viewer, by interacting with both the sonic and visual images, and by touching the surface to experience the rhythmic lines , is ultimately brought into the center of the picture.

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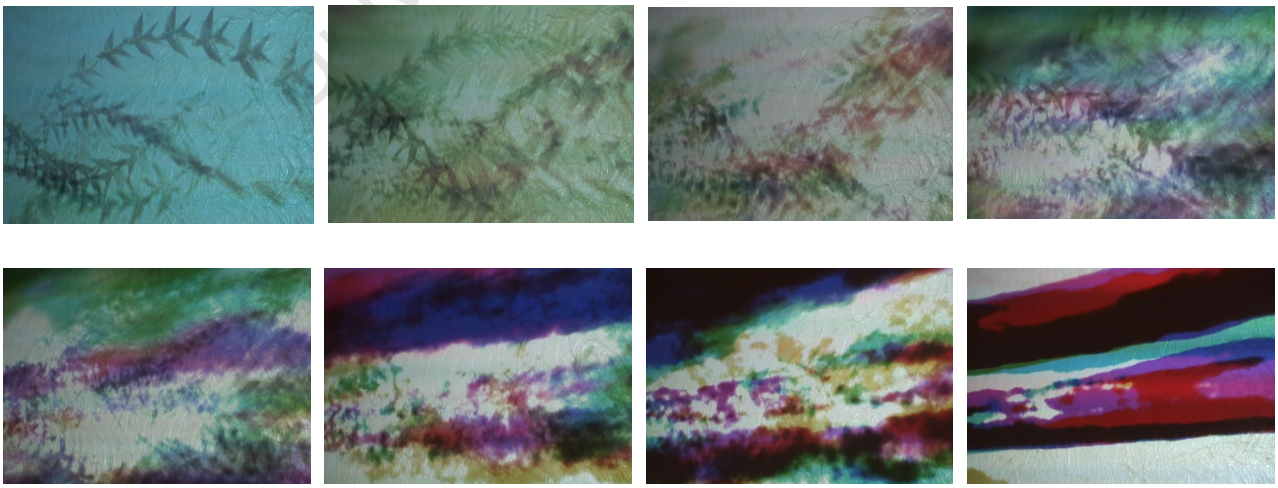
3D visual images. It has been widely used by VJs (visual disk jockeys), and by artists producing public artworks involving audio visual projections.

Ritratto Di Balla (2011-2012).



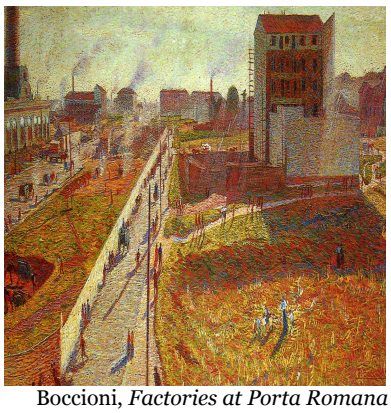
Ritratto Di Balla (video stills) (2011-2012).

Ritratto di Boccioni

Umberto Boccioni (1882-1916), it seems, was infatuated with the modern city and its construction. These themes are depicted in many of his early paintings - apartments, factories, streets, piazzas, trams, people and often, powerful horses. They are the subject of *Usines à Porta Romana (Factories at Porta Romana)* (1908) and are seen in the background of *Autoritratto* (1908). They are also seen beyond the balconies in *Ritratto dela Signora Massimino* (1908) and *Ritratto della sorella* (*Amelia) (*1909). They appear again in a Cubo-Futurist guise in *Visioni simultanee (Simultanous visions)* (1911), *La strada entra nella casa (The street enters the house*) (1911) and in *Materia (Matter)* (1911).

For my *Ritratto di Boccioni*, I referenced the balconies overlooking a noisy city street and I investigated Boccioni's idea for the unification of the painted object with the environment in order that no clear distinction would be made between them. This idea of simultaneity and interpenetration of the subject with the environment is apparent in the three paintings mentioned and also in his later sculptures *Fusione di una test e di una finestra (Fusion of head and window) (1912)* and *Testa+casa+luce (Head +house+light)* (1912), both of which have sadly been destroyed. Superposition/inter-penetration of the apartment and the environment was thus the main objective in my *Ritratto di Boccioni* polyptych.

I planned the five panels of the painting as facets of the sensory experience of being on a balcony. Furthermore, I wanted the gallery to be incorporated into the surrounding atmosphere so that it would enter the painting just as the noise of the street inter-penetrates the house. I sought to create florescent street-art which creates its own radiance (multiplied sensation), like neon lights, and I attempted to create the texture of painted city-walls which record the passing of time as the graffiti is painted–obliterated-painted-obliterated and painted again. Above all, I sought to create the experience of the noise from the street in an integrated visual, sonic and olfactory image – the din of traffic that enters the city apartment – the smell of vanilla wafting from the kitchen punctured by the sound of grinding coffee beans and dishwashers. I wanted the sound-images from the balcony to



Boccioni, *Factories at Porta Romana* (1908).

Boccioni, *Autoritratto* (1908).

Let us explain again by examples. In painting a person on a balcony, seen from inside the room do not limit the scene to what the square of the window renders visible: we try to render the sum total of visual sensations which the person on the balcony has experienced: the sun-baked throng in the street, the double row of houses which stretch to right and left, the beflowered balconies etc. This implies the simultaneity of the ambient, and, therefore, the dislocation and dismemberment of objects, the scattering and fusion of details, freed from accepted logic, and independent from one another. In order to make the spectator live in the center of the picture, as we express it in our manifesto, the picture must be the synthesis of what one remembers and what one sees. You must render the invisible which stirs lives beyond intervening obstacles, what we have on the right, or the left and behind us, and not merely the small square of life artificially compressed, as it were,by the wings of a stage set. We have declared in our manifesto that what must be rendered is the dynamic sensation, that is to say, the particular rhythm of each object, its inclination, its movement, or more exactly, its interior force." (Boccioni, ETP, 1912)

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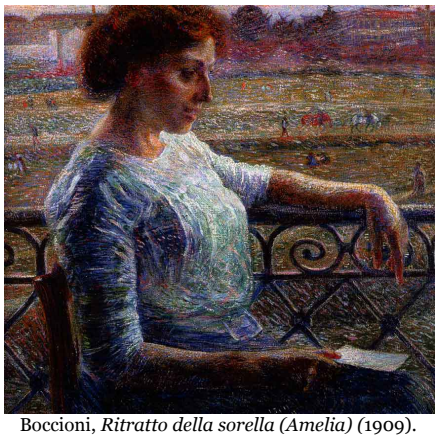
inter-penetrate the tactile images of the painted surface. I needed the viewer to feel the different forms of inter-penetrating textures and to experience the different vibrations that each sound makes at different points across the surface.

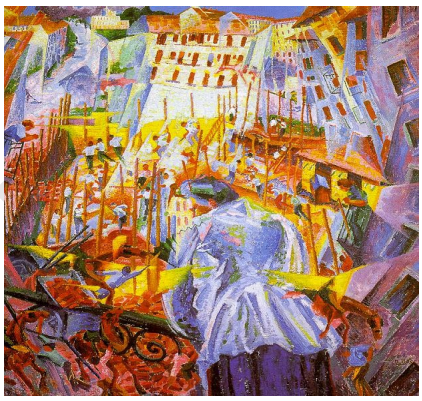
In creating the work I use sixteen loudspeakers mounted on the reverse of the painted surfaces which cause distinct regions of the painting to resonate. The jazz or classics you may hear playing is not a recording but a live broadcast from the local music-radio station (FMR)! The present inter-penetrates the past – the sounds I recorded in the streets of Milan during 2011 mingle with the live broadcast. All of my recordings are multi-tracked (layered) sonic images, so that different locations and times are heard simultaneously. Three motorbikes roar just as the lights turn green at an intersection. A police siren swells and receeds, changing pitch as it does so. Cars hoot incessantly– and there is a constant buzz of scooters like a swarm of bees coming at you from all directions overlaid with the distinctive sound of Milan's trams – the high pitched squeal of wheels on steel.[55] My recordings were made in busy piazzas, chaotic intersections and quiet streets late at night where you may hear the slam of a car door, a lone Vespa making a U-Turn, echoes of footsteps, church bells and people calling their farewells – *Ciao!*

Every city's streets has its own distinctive sonic texture, and what I aimed to achieve was that if you listened with your eyes shut, you would be able to recognise Milan as easily as if I had painted the *Caffe Biffi* in the *Galleria* on the *piazza del Duomo*. Not all of the sounds come from loudspeakers. Empty tin cans clatter inside a plastic garbage bag, real cutlery and crockery rattle, and real glasses tinkle against a real grappa bottle. If you touch the surface of the painting – you can feel them clink-clanking one against the other.

In order to detect the presence of the viewer, I embedded light dependent resistors into the painting's surface. These detect the intensity of shadows moving across them. From this the micro-controller (Arduino), which controls the various sound and smell producing elements, is able to detect where the viewer is in relation to the painting - ranging from two meters away until the viewer actually touches the surface. From a distance, sound recordings of the streets are heard



Boccioni, *Ritratto della sorella (Amelia)* (1909).



Boccioni, *La strada entra nella casa* (1911).

Boccioni, *Materia* (1911).

Boccioni, *Visones simultaire* (1911).

55 Some of Milan's trams still run on the original tracks that we see in *Simultaneous visions* (1911).

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from each of the five panels. When the viewer moves in close, sounds from different rooms in the house can be heard and motors are activated which rattle the cutlery, crockery and tin cans. When the viewer is really close, or touching the surface, those annoying electronic toys and irritating intruder alarms are activated, as are the small pumps which diffuse distinctive household smells.

In sum, the viewer, when interacting with this portrait, is bombarded with multiplied sensations unifying the public environment of the street with the private experience of a balcony in one's own home. Time and space inter-penetrate across the senses.

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Ritratto di Boccioni (installation view) (2011-2012).

Ritratto di Boccioni (detail) (2011-2012).

Ritratto di Russolo

Luigi Russolo (1883-1947) had interests quite different from those of the other Milanese painters, these included music, metaphysics, the occult and an interest in synæsthesia (Chessa, 2012:112). Martin notes that his early works such as *Rivolta (Revolt) (1911)* have a "poster-like strength and symbolic immediacy [which] express the anti-art side of Futurism, which Russolo was to exploit much more creatively in his *Art of Noise*" (1968:118-9).

Russolo's manifesto AON (1913) is in the form of a letter to the Futurist musician Balilla Pratella. Russolo, who came from a musical family, explains that, he was not a professional musician (although he was an accomplished pianist), but he had come up with the idea that music could be rejuvenated by adding the element of "noise". Significantly, he signs his letter "Russolo, (painter)" (AON, 1913).[56]

In both *Rivolta (1911)* and *Automobile in corsa (Automobile at speed) (1913), Russolo* uses colours and angular shapes to depict lines of force as "shock-waves" - or "sonic booms". My *Ritratto di Russolo* explores how painting can be moved beyond the visual into something else – perhaps a sonic-boom of multiplied sensations or the augmentation of the visual-image by means of shock waves.

Ritratto di Russolo is in two parts. The first part, *Noise,* has an encaustic under-painting which echoes the angular shapes of Russolo's shock wave imagery. In the dim lighting in which I present the work, it is probably easier to feel these shapes than to see them. The encaustic under-painting has been painted/sprayed over with oil and florescent paint, then scarified and pierced from the back with staples. The scratches (revealing the colour of the under-painting) have been augmented by short paint-marks of saturated colour. I aimed to combine the visual and tactile representations of noise. At the top of this painting, protruding from the painted surface, is an arc of what I regard as "white-noise-intoners".[57] These contain flash-guns (salvaged from disposable cameras) which

In analysing Russolo's writings and works what strikes us above all is the peculiar continuity and coherence of his concepts, and how they migrate from painting to music to philosophy. Since the occult is an inquiry that often embraces synaesthesia, a critical acceptance of Russolo's continual interest in the occult reconciles the seeming conflicts among the various activities, and their related expressive sensory fields, that he undertook (Chessa, 2012:6).

Hoooooootscreeeeeeeeetchsqueeeeeeeeeeelthuddddddddcrashcrunnnchtinkletinkletinkletinkletinklesilence.....

Russolo, *Automobile in corsa (1913).*

Russolo's *Intonarumori* reconstructed for a performance at SFMoMa (2009).

amongst the 27 different intonorumori invented by Russolo were the

- *Gracidatore* (Croaker)
- *Crepitatore* (Cracker)
- *Stroppicciatore* (Rubber)
- *Scoppiatore* (Burster)
- *Sibilatore* (Whistler)
- *Gorgogliatore* (Gurgler)
- *Ululatore* (Howler)
- *Ronzatore* (Hummer)

56. It can be argued that Russolo made a greater contribution to music than to painting. Russolo's ideas on noise were taken up by the Fluxus artists of the 1960s and 70s, and today he is remembered in a prestigious international music prize- the *Concorso Internazionale Luigi Rusolo*. The award, begun in 1979, is for electro-acoustic music and more-recently includes sound art (studioforum, 2012).

57. "White noise" is a frequency spectrum that is continuous and uniform over a specified frequency band (random frequencies evenly distributed). Pink noise is where there is equal power per octave (Federal Standard 1037C).

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are fired by a micro-controller (Arduino) when it detects the viewer touching the florescent "pink noise" area of the surface. A passive infra-red sensor is used as the detecting device.

In a deliberate attempt at startling the viewer, *Noise* tries to activate one of the reflexes which sets up one of the most basic states of mind. Accompanied by the blare of a car's horn, a bright flash both startles and creates an "after-image" of the painted surface – inverting the colours the viewer sees – the result of sensory overload.

In the second part *Music,* I caricature Russolo's *intonorumori* and visually depict, in encaustic, music as clouds of solid colour - much like Boccioni's idea that paintings would in future consist of clouds of coloured gas. The figurative *intonarumori* that I present in an otherwise abstract field are a reminder that Russolo, unlike the others, never made the leap to pure abstraction. There is a deliberate visual contrast between the flowing forms of *Music* and the broken marks of colour in *Noise*, emphasised by the different haptic sensations of touching the smooth polished surface compared to the prickly scarified one.

The video camera (web-cam) whose cable disappears into the surface of *Music*, is connected to a computer system running a VVVV patch, which converts colour variations (of the red clouds detected by the camera) into synthesised musical instruments. The camera is designed to be held close to the surface of the painting and detects an image which it analyses for colour variations. Six pre-programmed MIDI channels respond to what is "seen", producing a polyphonic sonic representation of the colour and texture. The variation in texture controls the synth sweep, and variations in hue and intensity are played as synthesised sounds accompanied by environmental noises. The only recognisable musical instrument is a (synthesised) concert-grand – a reference to Russolo's musical talents.

In allowing the viewer to translate a visual image into a sonic form as an extempore "composition" and to hear both the colour and the texture of the painting, I wanted to produce a form of artificial synæsthesia, which forces the viewer to become absorbed in the process and which is aimed at both multiplying the viewer's aural sensations, and placing the viewer at the center of the picture.

We must break out of this restricted circle of pure sounds and conquer the infinite variety of noise-sounds [...] *Futurist musicians must constantly enlarge and enrich the field of sound. This responds to a need in our sensibility. Indeed, we note that the most talented composers of today are tending to adopt the most complicated dissonances. As they move ever farther away from pure sound, they almost achieve noise-sound. This need and this tendency can be satisfied only by adding and substituting noises for sounds [...] The sensibility of the musician, liberated from facile and traditional rhythm, must find the way to enhance and renew itself in noises, for every noise offers a union of the most diverse rhythms, aside from its predominant one [...] The variety of noises is infinite. If today when we have perhaps a thousand different machines, we can distinguish a thousand different noises, then tomorrow, as new machines multiply we shall be able to distinguish ten, twenty, or thirty thousand different noises, not merely to be imitated, but to be combined as imagination dictates* (Russolo, *The art of noises,* 1913).

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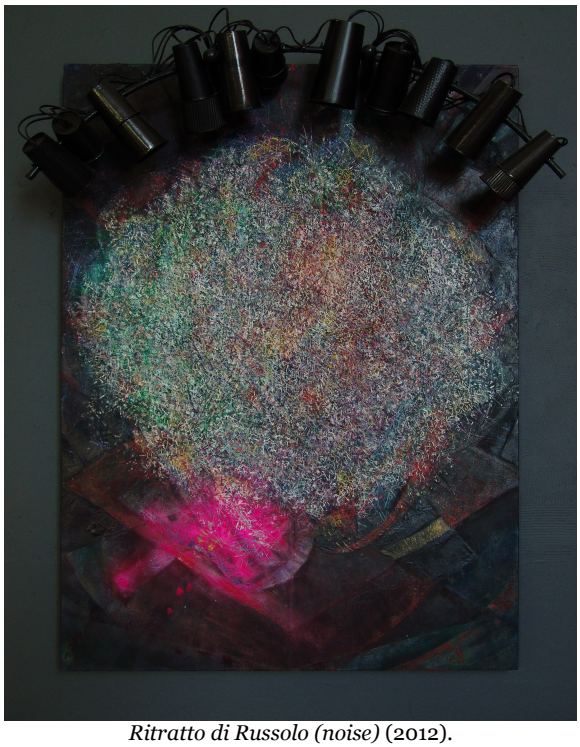
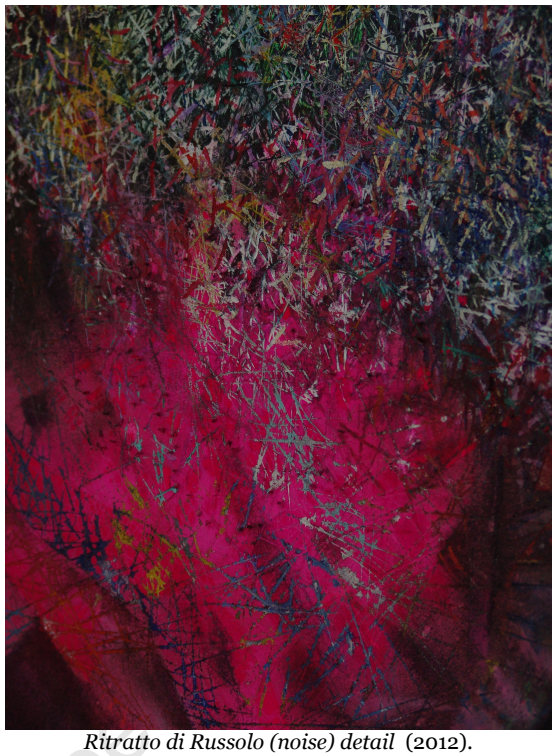
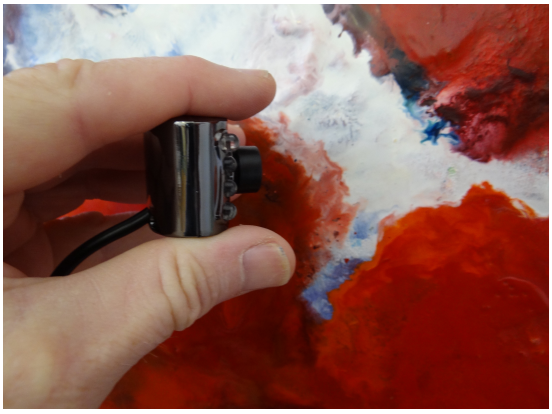


Ritratto di Russolo (noise) (2012).



Ritratto di Russolo (noise) detail (2012).

Ritratto di Russolo (music) (2012).



Ritratto di Russolo (music) detail (2012).

Ritratto di Severini

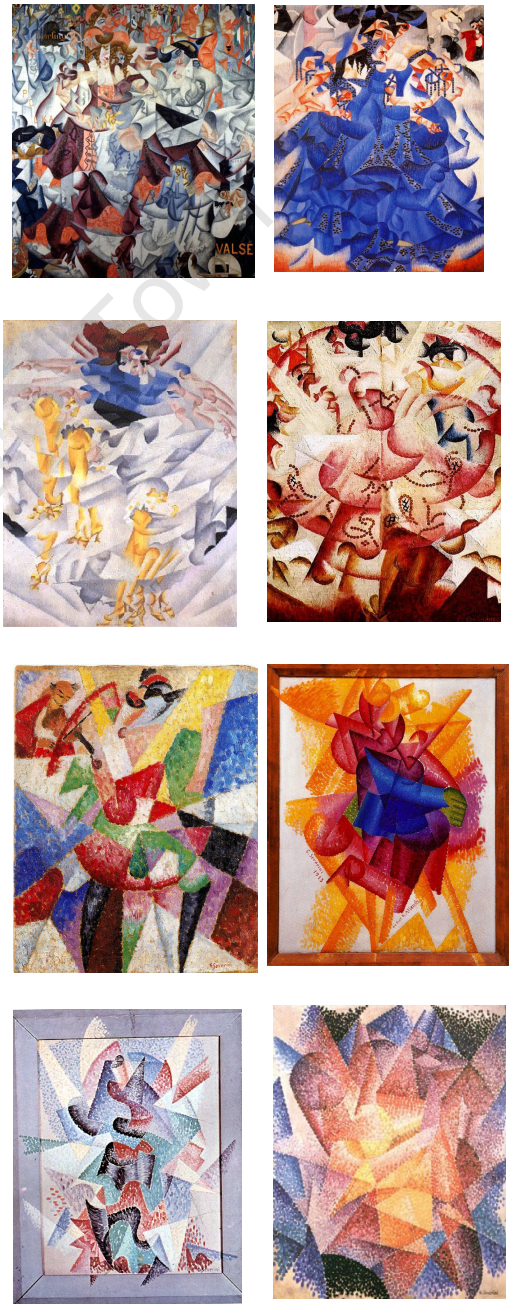
Gino Severini (1883-1966), like Boccioni, had studied painting in Rome under Balla, but since 1906 had been based in Paris, where he had been highly influenced by the Cubist artists. Indeed, for a brief period, he and Braque had occupied studios in the same building (Martin, 1968:77). Like many of the artists living in Paris at the time, his subject matter was often the cafes and nightclubs of Montmartre. Dancers feature prominently in his oeuvre, and there is an interesting progression of forms from his Cubist influenced *La Danse du Pan-pan à Monico* (1910), through his more abstract *Danaztrice a Pigal* (1912) and to his pure abstraction *Espansione sferica della luce (centrifuga) (The spherical expansion of light).* (1914).

In my *Ritratto di Severini,* I have taken up Severini's theme of dancers becoming light and created an immersive environment. The portrait is activated by the viewer "dancing" on the painted surface. The noise of the dancer's footsteps are picked up by microphones and their movements are caught by coloured shadows cast from overhead Red/Blue/Green (RGB) light sources. The lights (and shadows) dance in time to the movements, changing as overhead infra-red motion detectors track the position of the dancer.

In creating this work, I was interested in experimenting with the lesser known senses of proprioception and equilibrioception. By arranging that the panels of the painted floor be loose and uneven, I require the viewer to become aware of these lessor sensory modalities. Severini used cut out shapes of aluminium in a number of his paintings from around 1913, and my use of cut out panels, painted with metallic paint, references this aspect of his work.

The shapes used in both the overhead lighting rack and the painted surface are derived from Severini's *Spherical expansion of light (centrifugal) (1914)* .

The most significant change from Severini's earlier dance paintings is the treatment of light, which does not come from a visible external source, but from the dancers themselves. Whereas in the earlier works light was an independent catalyst of motion, the dancers are now the seeming sources of light as well as of movement, metaphorically and pictorially (Martin, 139-40).



Severini, (left to right, top to bottom) 1. *Hieroglyphic dynamic of the Bal Tabarin* (1912) 2. *Blue dancer* (1912) 3. *White dancer* (1912) 4. *Dancer at Pigal* (1912) 5. *Dancer and gypsy* (1913) 6. *Argentian tango* (1913) 7. *Shapes of a dancer in light* (1913) 8. *Spherical expansion of light (centrifugal) (1914).*

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The overhead RGB lighting and the intersection of light sources creates primary and secondary colours on the grisaille painted on the dance-floor in metallic enamel paint (Hammerite).

In *Ritratto di Severini* my aim is for the viewer to experience “dynamic sensation” of movement and light in an immersive environment whilst being at the center of the picture. The viewer experiences the painting's visual image from an unusual angle, and the image appears to move relative to the viewer as he or she skips and dances around.

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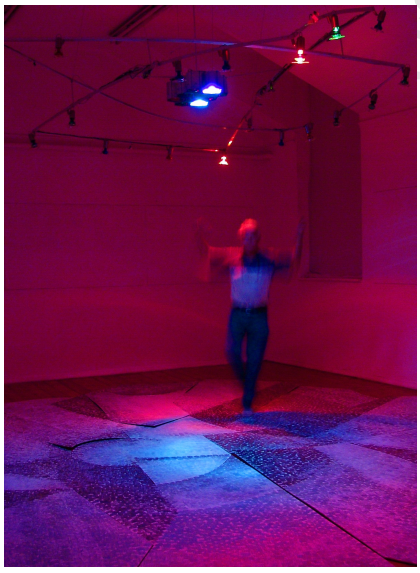

Ritratto di Severini (installation views)(2012-2013).

Ritratto di Carrà

Carlo Carrà (1881-1966) met Boccioni and Russolo two years prior to the publication of FPTM (1910). Martin notes that there was always intense rivalry between Cara and Boccioni with regard to the origin of theoretical ideas (Martin, 1968:151,185), but Carrà was able to claim credit for the idea of the spectator at the center of the picture (Poggi, 2002:311). It was thus appropriate that I should choose this idea as the focus of my *Ritratto di Carrà.*

Cara, *Funeral of the Anarchist Gallii 1911,* detail.

Throughout the mechanical or sporting world, sounds, noises, and smells are predominantly red; in restaurants and cafés they are silver, yellow, and violet. While the sounds, noises, and smells of animals are yellow and blue, those of a woman are green, blue, and violet.

THE PAINTING OF SOUNDS, NOISES, AND SMELLS DEMANDS: [...]Signifying the painting's dynamic construction (its polyphonic architectural whole), conceived as every painting's universal subject and its sole reason for being (PSNS, 1913).

While all of the portraits use the idea of the spectator at the center of the picture by virtue of being interactive, using the viewer's cast shadow or by other techniques, I was particularly interested to explore methods of enticing a viewer to become immersed at the center of this particular work. I adopted a number of complimentary strategies to achieve this. Using a large canvas with linear elements (lines of force) pointing toward the center in a way not dissimilar from Cara's *Funeral of the anarchist,* I attempted to produce a visual vortex giving the viewer the feeling of falling into a hole – creating a psychological perspective. In addition, I increased the level of detail from the outer edge towards the center, relying on natural inquisitiveness to see more and thus come closer to the center. In this case, the viewer will discover that the most detailed portion of the surface is not painted – it is an LCD computer screen which sits within a cut-out at the center of the canvas. As the spectator moves closer the image on the screen begins to move which attracts the eye. To encourage the viewer to come even closer, a sonic image (noise) is generated when the viewer gets to within 1,5 meters. At that point the image on the computer screen begins to track the viewer's head movements. The geometric forms are transformed as the viewer moves closer or further away, and the pitch of the sonic image changes up or down. By the time the viewers realise that they are controlling the motion of the visual image and the frequency of the sound, they are within arms length of the surface, and their field of view is fully filled by the painting.[58]

The LCD screen at the center of the picture shows an image generated by a VVVV patch using a web-cam hidden in the

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58 Excluding peripheral vision (which extends to almost 180 degrees), the human eye can see approximately 100 degrees in the vertical axis, and 120 degrees in the horizontal axis (Bourk et al., 2007). If a 2 meter wide painting is to become immersive and fill this field of view, the viewer needs to be within 1 meter of the canvas – just beyond arms length.

painting just above the cut-out. Face-tracking software detects both the user's proximity and movement. In response to this, the computer creates a number of simulated 3D forms, echoing the painted imagery, and literally places the viewer at the center of the picture, by including fragments of the viewer's face as a “texture” on one of the moving geometric forms, so that viewers will literally see themselves occasionally as part of the central image.

All of these devices conspire to draw the viewer into the center of the painting, and tests with viewers have shown that the desired effect is achieved.

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Ritratto di Carrà (2012).

Autoritratto

This work brings together the Futurist ideas I had investigated and my own ideas regarding interactive, multi-sensory art. In the five portraits of the Futurists, the viewer is confronted with a multi-sensory image. In *Autoritratto* multi-sensory images of the viewer (movement, space, colour, smell, sound and so on), are captured and the viewer is recorded in the center of the work.

The multi-sensory image data are translated by *Autoritratto's* computers into a series of mark-making-gestures. These gestures are then transmitted to its radio-controlled painter-vehicles. I relate these robotic gestures to the movement vocabulary of the Futurist dancer Valentine Saint-Point whose *Metachoric dances* include sharp, geometric movements (Berghaus, 1993:35-36) and also to the contemporary choreography Cindy Van Acker whose dance composition *Diffraction* (2011), consists of short and repeated movements of the dancer's limbs at specified time intervals, giving the appearance that the contorted dancer's body is a machine. Van Acker created a specialised dance notation for *Diffraction* and I similarly developed a specialised (but much simpler) gesture notation for my *Autoritratto*. So, for example the gesture "FR1-F3-FL1" creates an "S" mark instructing the painter-vehicle to go forward and right (a clockwise curve) for 1 unit, then straight forward for 3 units and then turn left and go forward and (making an anticlockwise curve) for 1 unit. The gestures are transmitted using three separate radio command frequencies (27, 40 and 49MHz), so that all vehicles can respond simultaneously, but differently.

The gestures of *Autorattro* can be thought of as the body-gestures of Jackson Pollock creating his "drip paintings". Pollock used the rhythm of his entire body and the proportions of his limbs had a direct influence on the resulting drip-marks. Like Pollock, the mechanical gestures programmed into *Autoritratto* do not produce completely predictable marks. The initial conditions of each "painter" will be different, for any given gesture. For example, it may be facing towards a wall, have one wheel in a dish of paint, or have become locked with another "painter".

Autoritratto combines a personal computer system (PC)

The gesture which we would reproduce on canvas shall no longer be a fixed moment in universal dynamism. It shall simply be the dynamic sensation itself.(....) The time has passed for our sensations in painting to be whispered. We wish them in future to sing and re-echo upon our canvases in deafening and triumphant flourishes (FPTM, 1910).

Hans Namuth, *Jackson Pollock at work* (1950).

On the floor I am more at ease. I feel nearer, more part of the painting, since this way I can walk around it, work from the four sides, and literally be in the painting (Pollock quoted in Karmel & Varnedoe, 1999:147).

University of Cape Town

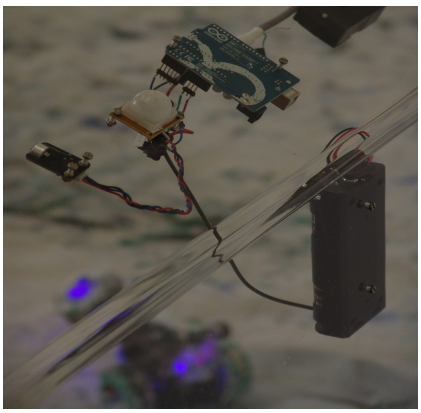
connected to a web-cam and a microphone with 3 micro-controllers (Arduinos), sound sensors, light dependant resistors, passive infra-red detectors and gas detectors (methane and CO2), all mounted on shaped PMMA (Perspex) panels. On the one panel the PC runs a VVVV patch which takes the movement data detected by the web-cam and combines them with the frequency analysis (FFT) of the microphone inputs. These data are used to select the appropriate gesture which is sent to the micro-controller for interpretation and transmission. On the other two panels the micro-controllers directly analyse the sensor data (sound and light/infra-red intensity and the presence of certain gasses), compute the gesture and then transmit them. The painter-vehicles consist of reconfigured children's toys which have been modified to carry various brushes, sponges and other painting paraphernalia.

In self-portraiture, it is common to find the artist, palette and brush in hand, caught in the act of painting. *Autoritratto* follows this tradition. Unlike the other portraits that I produced in the course of my experiments, paint, as a material, plays a secondary role. The work consists primarily of a PMMA enclosure together with an assortment of modified consumer electronics. The canvas, paint-brushes and dishes of paint that are used reference the painting materials traditionally included in self-portraits. *Autoritratto* is a portrait of myself in the action of painting.

The user willingly accepts the tyrannies of the computer because computers traditionally provide a model of clarity. However, they also traditionally limit what can be expressed and transmitted, thereby standardizing knowledge and inference through efficiency, planning, rationalization and managerialism. The great problem of today is to attain a balance and wholeness in our civilization so we can command the machine we have created instead of becoming its helpless accomplice and passive victim. We must leave room for an answering response, of an indeterminable kind, in order to allow for participation in the creative act. We must avoid a world in which whatever seems obscure and inward, whatever cannot be reduced to a quantity, is thereby treated as unreal-a world that is impersonal. Creators must place themselves above the level of the mechanical through the integration of art and technique. They must resist the quantifying of life in the interests of power, prestige and profit and resist the fashion of idealizing mechanical forces. Computer/robotic paintings symbolize a society that has freed itself from total rational utilitarianism through the symbolism of poetry in technology and by linking the primordial horrors to the technology of today. They are in great measure a reaction against the organizational harness of the post-industrial society, the technocratic mind view (Nechvatal, 1988:120).

Lucien Freud, *Painter working, reflection* (1993).

University of Cape Town



Autoritratto (installation view) (2012).

5. FINALE

*Futurist Painting: Updated Technical Manfesto (FPT*2011), the manifesto I produced at the beginning of my project, begins with the statement: "The cry of rebellion associates our ideals with those of the Futurist painters" and it concludes with the demand: "Make room for change, for violence, for daring and sensation!" My research into Futurism and my interests in the sensorium lead me to the idea of creating interactive, multi-sensory paintings placing the body of the viewer at the center of the picture so that it could respond to the lines of force and the dynamic and multiplied sensations projected by a multi-sensory-image.

The experiments I conducted between 2011 and 2012, were of the sort that the Futurists themselves conducted – an investigation into the possibilities opened up by the ideas I had set out in my manifesto FPT2011. My experiments resulted in five abstract portraits - one for each of the *gruppo dirigente de pittura* (the management committee of the painters) of the Futurists who had signed the painting manifestos of 1910. In making these portraits, my aim was to try out different styles, methods, materials and concepts which would best express the ideas of the particular Futurist I was portraying. Considering the variety of work produced by the Futurist painters between 1910 and 1914, and the various styles of their own self-portraits, I reasoned that my rather eclectic approach to each portrait would be entirely appropriate.

Producing an interactive, multi-sensory Futurist painting turned out to be a lot more difficult than I had first imagined. It was not like cooking or baking a *panettone*[59] where, after following a standard recipe, one can consistently produces a voluptuous, multi-sensory cake-bread. Whether representational or abstract, multi-sensory paintings require deliberate construction of the sensory stimuli, encoding each of them carefully within the surface of the work. I found that combining visual, sonic, haptic, olfactory and other images into a composite whole could sometimes be harmonious or discordant or jarring, but sometimes just became a muddy mess– so establishing the exact counterpoint to create the unique multi-sensory image according to my intent required

59. *Panettone* is a traditional cake-like bread, which originated in Milan.

University of Cape Town

hard work. In addition I learned that new-media and traditional media do not sit easily together (Guzak, 1997). For instance, in my early experiments I tried to combine computer generated (interactive) projections with painted surfaces, but found that the colours interfered with one another, and the video tended to overpower the painted image.[60] However, by separating colour from texture as I did in *Rittratto di Balla,* or by separating colour from tone as in *Ritratto di Severini ,* I was able to obtain a more satisfactory combination of projected and painted images. I have previously noted the problems of capturing or embedding smells into paints, and there were many other problems encountered during my experiments and tests with viewers. One example is the reliability issue when digital technology is involved - most visitors to contemporary exhibitions have encountered dysfunctional (non-interactive) artworks.[61] Another issue is the usability of an interactive work (Raskin 2000). If the viewer needs to be able to listen to a painting, discern feint traces of smells, enjoy tactile surfaces by touching them, and experience an artwork with his or her entire body, how are they to know what to do, given that viewers in art galleries are accustomed to only looking and listening.[62] The conventional solution is to create what Donald Norman calls "affordances" - buttons ask to be pushed, handles want to be gripped and so on (Norman, 1988:9-11,87-99). However these affordances are not always in line with the concepts of the work. In my experiments, I found that I could usually rely on natural inquisitiveness to draw the viewer close enough to the art work to be detected by sensors such as ultra-sound range-finders, passive infra-red motion detectors and cameras. Then by providing some form of feedback, such as changing the visual image, the sound or the lights, viewers begin to experiment and discovers how they should interact with the work. However, this does not always succeed, especially if the viewer is an adult - and so sometimes they just

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60. Pippiloti Rist's *Laguna* (2011) combines projected images with Venetian landscape paintings. However these are not interactive videos so that it is possibly to carefully select the appropriate projecting image and paintings (such as those with flat areas of skies, waterways and piazzas), and to experiment with combinations that work .

61. At the 54th Venice Biennale (2011) , one of the collateral events was Federico Diaz's' installation *Outside itself* (2011) , which consisted of two industrial robots assembling a sculpture made from thousands of black ping-pong balls. The robots were programmed to react to changing light conditions, so that the viewers affected the resulting sculpture. This was probably the most costly artwork at the Biennale. However, on the day that I visited the exhibition, one of the two robots was not operational and a technician was busy trying to resolve a software problem.

62. When my youngest son was not yet a year old, he got into the habit of climbing on the back of the couch and scraping his nails against a large painting which was hanging behind it. He was attracted to the bright colours, and seemed to enjoy the tactility of the surface and the noises it made. I suspect all children do this naturally, but are subsequently taught to "look with your eyes, not your hands"!

have to be told! In my case, this is done by providing instructions along with the titles in the gallery.

My experiments did produce some serendipitous results on both a technical and an æsthetic level. I had not, for instance, considered that the vibrations from the speakers and rattling objects of *Ritrattto di Boccioni* would be felt over and above the haptic image of the painted surface, but this is exactly what I needed in terms of interpenetration and simultaneity. Nor had I expected that interacting with the video at the center of the *Ritratto di Cara*, or exploring the midi-sounds derived from the hand-held web-cam image in *Ritratto di Russolo (music)* would be mesmerising, as reported by some viewers.[63] However, this is what "placing the spectator at the center of the painting" aims to achieve.

In the end I believe that by imposing certain constraints on my project, I have been forced, as a practitioner, to consider the Futurists' ideas of painting in a very specific way. My project has, I believe, raised some intriguing questions regarding the nature of painting and its relationship to the senses. The works I produced are my response to the challenges posed to painting and artistic practice by the sensorium and the Futurist painters' ideas of multiplied sensations and states of mind, interpenetration and superimposition, lines of force, and the spectator at the center of the painting.

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63. I have consistently used the term "viewer" throughout this document, even where interactive art is concerned although "participant" or "viewer-participant" is becoming more commonly used.

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University of Cape Town

Appendix A: FPT2011 – Futurist Painting: Updated Technical Manifesto

September 2011

Our cry of rebellion associates our ideas with the first Futurist painters. These ideals were not invented by some aesthetic clique. They are the expression of a violent desire which boils in the veins of every creative artists today.

We fight with all our might the fanatical religion of the past. We declare war on all artists and all institutions which insist on hiding behind a façade of false modernity, while they are actually ensnared by tradition and academicism. We heed the call to introduce the fisticuff into artistic battle, to assault those fantastical, senseless and snobbish painters of the past whose works are alternately violent, pornographic, trite, vapid, conformist, consumerist, meaningless and brainless; those superficial, slovenly, facile and banal paintings encouraged by the vicious existence of the art-world; these are the paintings worthy of our deepest contempt. We will play our part in the crucial revival of aesthetic expression.

Away then with the critics, those complacent pimps! Paid critics and curators have other interests to defend. Exhibitions, competitions, superficial and never disinterested criticism, condemn art to the ignominy of true prostitution. Down with gouty academics and drunken, ignorant professors! Of the French intellectuals and their followers we say: To the flames. Down with artists whose art works mimic advertising. Down with laborious decorators and designers, phony 404 pixel manipulators, sold-out poster painters and shoddy, idiotic illustrators! Nothing is absolute in painting. What was truth for the painters of yesterday is but a falsehood today.

We tell you again that the triumphant progress of science is making profound changes inevitable for humanity - changes which are hacking an abyss between those docile slaves of past tradition and us free moderns, who are confident in the radiant splendour of the future. Living art draws its life from the global environment. We must breathe in the tangible miracles of our borderless society, the satellite network of speedy communications that envelops the earth, those marvellous flights which furrow our skies. How can we remain insensible to the frenetic 24-7 psychology of the life of our great cities, the feverish figures of the *bon viveur*, the cocette and the meths-drinker?

The construction of pictures has hitherto been foolishly traditional. Painters have shown us the objects and the people placed before us. We shall henceforward put the spectator in the center of the picture.

Space no longer exists and who can still believe in the opacity of bodies, since our sharpened and multiplied sensitiveness has already penetrated the obscure manifestations of the medium? Why should we forget in our creations the doubled power of our sight, capable of giving results analogous to those of X-rays?

The gesture which we would reproduce on canvas shall no longer be a fixed moment in universal dynamism. It shall simply be the dynamic sensation itself. We declare that a portrait must not be like the sitter, and that the painter carries in himself the landscapes which he would fix upon his canvas. To paint a human figure you must not paint it; you must render the whole of its surrounding atmosphere.

All things move, all things run, all things are rapidly changing. A profile is never motionless before our eyes, but it constantly appears and disappears. Moving objects constantly multiply themselves; their form changes like rapid vibrations, in their mad career. The sixteen people around you in a rolling motor bus are in turn and at the same time one, ten, four, three; they are motionless and they change places; they come and go, bound into the street, are suddenly swallowed up by the sunshine, then come back and sit before you, like persistent symbols of universal vibration. The bus rushes into the houses which it passes, and in their turn the houses throw themselves upon the bus and become a new object. But our growing need of truth is no longer satisfied with mere optical painting as has been understood hitherto. A balloon and a pin together become a new sonic object that is neither balloon nor pin. The time has passed for our sensations in painting to be whispered. We wish them in future to sing and re-echo upon our canvases in deafening and triumphant flourishes.

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Our voluptuous art will activate a primordial and synæsthetic response in the minds of our public. We say: Let them follow their emotions! Let them fondle and caress or gouge and slash and rip the hearts from out of our paintings! Let them trample them underfoot!; all this we will accept as fair exchange for them never to walk right past.

With our enthusiastic adherence to Futurism, we therefore declare:

(1) That all imitation of reality, all pedantry and academic formalism, all triteness, shallowness and means of instant gratification in painting must give way to the painting of a new reality that pulsates with energy.

(2) That art critics are useless and dangerous.
(3) That the words "meaning" and "relevance" and other loose expressions impose a tyranny against which we must rebel.
(4) That the painter must paint with every available material and technology both ancient and modern that can be touched and smelled and tasted and listened to. The surfaces of our paintings shall henceforth act as the initial point of contact for our public's sensory experience. Our works shall become as electrodes reaching into our public's minds, firing and inhibiting neural activity and constructing new pathways of experience of our Futurist art.
(5) That universal dynamism must be rendered in painting as a dynamic sensation.
(6) That light destroys the materiality of bodies, and that scents and flavours and sounds create them.
(7) That every subject or theme of contemporary life which is continually and splendidly transformed by Victorious Science is to be celebrated and that those worn out, clichéd motifs where victims are constructed or where identity-politics is explored must be rejected, being as nauseous and as tedious as adultery in literature.

We wish to explain this last point. Nothing is *immoral* in our eyes; We are told that the subject is nothing and that everything lies in the manner of treating it. That is agreed; we too admit that. It is the monotony of the subject against which we fight.

We therefore demand, for twenty years, the total suppression of the theme of identity in painting.

Make room for change, for violence, for daring!

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