



UNIVERSIDADE CATÓLICA PORTUGUESA

CREATIVE INTERACTIONS BETWEEN VISUAL TECHNOLOGY AND SOUND  
ART IN A LIVE PERFORMANCE CONTEXT

Tese apresentada à Universidade Católica Portuguesa para obtenção  
do grau de Doutor em Ciência e Tecnologia das Artes na Especialidade  
de Arte Interactiva

por

Sónia de Sousa Ferreira Guedes Rodrigues

ESCOLA DAS ARTES (Mês  
e 2014)





UNIVERSIDADE CATÓLICA PORTUGUESA

CREATIVE INTERACTIONS BETWEEN VISUAL TECHNOLOGY AND SOUND  
ART IN A LIVE PERFORMANCE CONTEXT

Tese apresentada à Universidade Católica Portuguesa para obtenção  
do grau de Doutor em Ciência e Tecnologia das Artes na Especialidade  
de Arte Interactiva

Por Sónia de Sousa Ferreira Guedes Rodrigues

Sob orientação de Professor Doutor Álvaro Barbosa

ESCOLA DAS ARTES

(Mês e 2014)



## **Abstract**

For introducing this thesis, it is important to place it in a context of: models of interactivity – systems, systemic work, mediation, participation, collaboration, interfaces, dance, drawing, video, sound, interaction, multimedia, Digital versus analogue, layers, physical time versus performance and film time, physical space versus virtual space, material (paper ink etc.) versus light projection and sound, wearable technology, and to briefly pinpoint artists who are working in relevant ways for the discussion arising.

Within dance itself the use of new technology is also varied and has seen the creation of different contexts for Dance

The main question is on how to achieve a creative solution for non-intrusive technology for dance expression and a dialogue between different parts like drawing, video, dance improvisation, interactive performative dialogues and sound. By non-intrusive technology one means technology that does not physically interfere with the ability a dancer has to move freely like cables, wires or heavy suits that restrict movement instead of promoting it. Finding a research framework that goes towards this idea is at the forefront of this research as well as testing a system that goes towards this idea of allowing the dancers to perform freely without physical constrictions or barriers. The main research question is therefore split into several smaller items that will be looked at within the body of this research like where did the interaction between Dance and Technology had its roots?

This research focuses on finding a way to marry video technology, drawing, sound and live performance from the performer's point of view, to enhance the performer's ability to interact with the elements, for the performers freedom to move without technological constrictions. This project is about creating a situation that allows for observation of the performers, exploring and educating themselves through experimenting and experiencing technology brought together thinking about movement itself. It uses improvisation as a language tool to facilitate a dialogue between technology and live performance.

'LFPP' is proposing to develop a new approach to relationship between performer, stage and sound better still between performance and its special environment/context. It offers innovative possibilities without being intimidating. Once in place (once set up) it provides a new approach for artists to collaborate, it provides a common ground for Dance Performance and Fine/Sound Artists to merge their skills through experimentation with a live performance as the ultimate goal.

'LFPP' – Live Film Performance Facilitator tests and provides a new approach to the relationship between live performance, film and sound when combined in live performance situations. It enables the use of improvisation as performance language, giving birth to a constructive dialogue between video technology and live performance.

'LFPP' is a structured environment for exploration of movement through film concepts with the input given by drawings. It enables a live video to develop in front of the audience. It enables the performers to inhabit a truly responsive environment that changes depending on their reaction. It is a two-way dialogue between performers and spatial context powered by a second performer inputting drawings. It also frees the performers from directly having to manipulate any technology and deal with just the artistic result of it. It is therefore a human mediated technological environment.

'LFPP' was tested in a series of performances.

There are various ways in which Video and Technology are nowadays integrated into Live Performance. It is only natural that the marriage between these elements is going to create an increasingly fluid language for the future. I feel it is essential to think about creating a performance language which supports the ideas of artists, therefore the technology at the service of the artists and never the other way around. That is the idea when I refer to technology in the introduction as a tool for developing creativity.

## Resumo

Para realizar a apresentação desta tese será necessário, antes de mais, colocá-la no seu devido contexto: modelos de interactividade – sistemas, trabalho sistémico, mediação, participação, multimédia, representação digital versus analógica, camadas, tempo físico versus tempo de performance e vídeo, espaço físico versus espaço virtual, material (papel, tinta, etc.) versus projecção de luz e som, tecnologia vestível, e salientar resumidamente quais os artistas que se encontram a desenvolver trabalho relevante na presente área em discussão. Dentro da área da dança em si, já se assiste também à utilização de variadas novas tecnologias e à criação de diferentes contextos.

A principal questão que aqui se coloca, é como alcançar uma solução criativa relativa às tecnologias não invasivas para a expressão na dança, e como estabelecer um diálogo entre as diferentes partes, como o desenho, o vídeo, a improvisação na dança, os diálogos interactivos e performativos e o som. Quando fazemos uso do termo “tecnologia não invasiva”, estamos a referir-nos concretamente a qualquer tecnologia que não interfira com a integridade física de um dançarino e com a sua capacidade de se mover livremente, tais como cabos, fios ou roupas pesadas, que restrinjam os movimentos em vez de os fazerem fluir. Esta constitui a base do meu projecto: encontrar um quadro de investigação que vá ao encontro desta ideia, assim como encontrar um sistema de ensaio que permita ao dançarino actuar livremente, sem condicionantes ou barreiras físicas.

O tema principal de investigação encontra-se, como tal, dividido em vários pontos, que irão ser analisados individualmente ao longo da tese, como por exemplo: quando é que surgiu a interacção entre a dança e a tecnologia?

O enfoque principal desta investigação é o de tentar casar a tecnologia de vídeo, desenho, som e performance ao vivo do ponto de vista do performer, de forma a melhorar a sua capacidade de interacção com os outros elementos, com total liberdade de movimentos e sem constrições tecnológicas. Este projecto pretende criar uma situação que permita a observação dos performers, explorando e educando-se a si mesmos, através da experimentação e do uso de tecnologia aliadas ao movimento. A improvisação é utilizada como uma ferramenta de diálogo, de forma a facilitar a comunicação entre a tecnologia e a performance ao vivo.

O 'LFPP' propõe desenvolver uma nova abordagem para a relação entre o performer, palco, som e ainda, entre a performance e o seu ambiente/contexto particular. Oferece possibilidades inovadoras sem se tornar intimidante. Uma vez colocado (devidamente configurado), proporciona novas possibilidades de colaboração entre os artistas e uma base comum para que o espectáculo de dança e os artistas plásticos/sonoros possam fundir artes, através da experimentação e do objectivo último: a performance ao vivo.

O 'LFPP' (Live Film Performance Facilitator) testa e oferece uma nova abordagem à relação entre a performance ao vivo, filme e som, quando combinados em performances ao vivo. Permite a improvisação como linguagem de performance, dando origem a um diálogo constructivo entre a tecnologia de vídeo e a performance ao vivo.

O 'LFPP' é um ambiente estruturado, destinado à exploração do movimento através da projecção de vídeo, cujo input é fornecido por desenhos. Desta forma é possível desenvolver um vídeo em directo para uma audiência, permitindo que os performers se movam num ambiente verdadeiramente interactivo, que se altera de acordo com a sua reacção. É, portanto, um diálogo nos dois sentidos, entre performers e contexto espacial, complementado por um segundo performer que nos vai apresentando desenhos. Esta dinâmica liberta também os performers de manusearem directamente qualquer tipo de tecnologia, lidando apenas com o respectivo resultado artístico.

Trata-se assim de um ambiente tecnológico mediado pela acção humana.

O 'LFPP' já foi testado em vários espectáculos.

Hoje em dia, as componentes de vídeo e tecnológica encontram-se integradas de várias formas nas performances ao vivo. É, por isso, perfeitamente natural que o casamento entre estes elementos vá criar uma linguagem cada vez mais fluída no futuro. Creio que é fundamental pensar em criar uma linguagem de performance que harmonize as ideias dos artistas, no sentido de colocar a tecnologia ao seu dispor e não o inverso. É este o princípio base que defendo quando, ao longo da introdução, faço referência à tecnologia como uma ferramenta para desenvolver a criatividade.



## **Acknowledgments**

I have some people to thank, people that were always by my side both professionally and as friends. I would like to thank my friends and sometimes incredible advisors in different parts of the whole process, for never doubting and for always giving me time and a hand when most needed.

I would like to thank my supervisor, Prof. Doutor Alvaro Barbosa for his clarity and firm hand in helping me construct and organize what became a thesis. I also thank him the vision of always encouraging me to be myself and adapt my ways and work to an academic frame. Thank you for helping me understand how that could be done with your incredible experience and expertise.

In my research stay at Brunel University I would like to thank Professor Johannes Birringer for the opportunity to be at the Dap Lab and also other ventures that came out of it. And while I was in London for 4 months I would like to thank my friends for accommodating me. Thank you to Francisco Penedo for the help with videos, and thank you Ligia Malheiro for some translation work.

I would also like to thank my parents and sister for being there at different times of the process and helping me when I needed. Much needed help and support particularly at the final stage. I particularly thank my mother for being an incredible friend and for the support she gave me when I needed it unconditionally. And I thank the team at UCP and CITAR, my colleagues we made it all together and it was very important to exchange ideas.

Thank you for the crowdfunding contributions to print the thesis.

# Index

Abstract	5
i	
Resumo	iii
Acknowledgments	v
Index	vi
List of Figures	ix

1 Introduction.....	1
1.1 Motivation / Objectives.....	5
1.1.1 Motivation.....	5
1.1.2 Objectives.....	10
1.2 Research question.....	17
1.3 Structure of the thesis.....	19
1.4 Notes on methodology.....	22
2 Research Framework.....	24
2.1 Historical Overview.....	24
2.2 State of the Art, ANNEX 1 .....	31
2.3 Key concepts and practices in Dance and Technology .....	31
2.4 Chapter Conclusion.....	39
3 Original Work.....	43
3.1 Live Film Performance Facilitator (LFPF) as a tool.....	43
3.1.1 Video.....	46
3.1.2 Improvisation language in Dance.....	50
3.1.3 Interaction/Dialogue/Collaboration.....	53
3.1.4 Sound.....	66
3.1.5 Drawing .....	68
3.2 The Performances.....	74
3.2.1 “Untitled 1” performance, May 2010 .....	74
3.2.2 “Bela and the Belly”, August 2011.....	79
3.2.3 “The Howling Arm”, August 2011.....	85

3.3 Conclusion.....	91
4 Discussion and analysis of results.....	94
4.1 Baltic Movement Conference, New Media/New Dance in Gdansk, Poland..	96
4.2 Digital Futures Conference 2011 in Bournemouth, UK.....	97
4.3 Interactions Labor Saarbrueken, Germany .....	100
4.4 Interview to Sonia Rodrigues on Dance and Technology Interaction for the Arts Academy.....	103
5 Conclusions and Future work .....	110
5.1 Conclusion.....	110
Future work and Examples of different ways of using the system already tested.....	113
ANNEX 1.....	123
Bibliography .....	174
Websites.....	177



## List of Figures

Figure 1 The system LFPF + Untitled 1 performance.....	45
Figure 2 “Tall Ships” – Gary Hill’s Projective Installations 2 .....	49
Figure 3 Rehearsals of “Untitled 1” by Sonia Rodrigues.....	58
Figure 4 “Tall Ships” – Gary Hill’s Projective Installations 1 .....	62
Figure 5 “Tall Ships” – Gary Hill’s Projective Installations 2 .....	63
Figure 6 “Tall Ships” – Gary Hill’s Projective Installations 3.....	65
Figure 7 “Untitled1” by Sonia Rodrigues with LFPF 1.....	77
Figure 8 “Untitled1” by Sonia Rodrigues with LFPF 2.....	78
Figure 9 Bella and the Belly Installation by Sonia Rodrigues.....	80
Figure 10 “speakers & mirrors” application by John Richards in “Bella and the Belly” installation by Sonia Rodrigues.....	81
Figure 11 “Bella and the Belly” video with Hanna Ma by Sonia Rodrigues. Part of the Interaktionslabor 2011 in the former Coalmine of Gottelborn, Germany .....	82
Figure 12 “Bella and the Belly” video with Hanna Ma by Sonia Rodrigues. Part of the Interaktionslabor 2011 in the former Coalmine of Gottelborn, Germany.....	84
Figure 13 The making of the wearable analogue sound piece by Michelle Danjoux (wearable technology designer) in collaboration with John Richards (Sound Artist) with exploration by Sosana Marcelino (Dancer).....	86

Figure 14 Video by Sonia Rodrigues “Howling Arm”. The making of the wearable analogue sound piece by Michelle Danjoux (wearable technology designer) in collaboration with John Richards (Sound Artist) with exploration by Sosana Marcelino (Dancer).....	90
Figure 15 Performance with Edge 2013, video by Sonia Rodrigues.....	115
Figure 16 Performance with Edge 2013, video by Sonia Rodrigues 2.....	116
Figure 17 Performance with Edge 2014, video by Sonia Rodrigues .....	118
Figure 18 Examples of origamis used to project onto the piece.....	119
Figure 19 Drawing by Ana, 5 year old about the multimedia piece she participated in with LFPP.....	121
Figure 20 Devolution by the American Dance Theatre .....	123
Figure 21 Random Dance Company performing “FAR” .....	127
Figure 22 Metapolis, Plan K by Charleroi Danses.....	131
Figure 23 Emotional Energy by Silke Z.....	134
Figure 24 Piece by Philippe Decoufle “Solo” .....	136
Figure 25 Biped, Merce Cunningham, example of Motion Capture Animation.....	141
Figure 26 “A Machine to See With” by Blast Theory .....	144
Figure 27 Whatever Dance Toolbox by BADco .....	146
Figure 28 Whatever Dance Toolbox in Action.....	147

Figure 29 Whatever Dance Toolbox Manual.....	148
Figure 30 Apparition by Klaus Obermeyer.....	151
Figure 31 INsideOUT by Claudia Robles at the University of Miami’s CAS Art Gallery (USA).....	152
Figure 32 Dead Dreams of Monochrome Men by David Hinton, a Dance Film version of DV8 choreography.....	153
Figure 33 Video Installation “Corridor” by Bruce Nauman.....	157
Figure 34 Video Installation by Bill Viola “Heaven and Earth” .....	159
Figure 35 Piece “Divide by zero” by Nina Kov.....	162
Figure 36 Musique de Tables by Thierry De Mey.....	163
Figure 37 Rosas danst Rosas filmed by Thierry De Mey .....	165
Figure 38 Jackson Pollock working with his unique upright position and painting a floor surface.....	166





# CREATIVE INTERACTIONS BETWEEN VISUAL TECHNOLOGY AND SOUND ART IN A LIVE PERFORMANCE CONTEXT

## **1 Introduction**

The swiftness with which the last century shaped an electronically linked planet is reflected in the rapid expansion of art practices - the marriage between art and technology which gave birth to 'the most ephemeral art of all: the art of time' (Rush, 1999).

The last two decades have seen a real growth in the use of technology within live performance. This is partly to do with the fact that video equipment and computers have been developed for a domestic market – so are more affordable and accessible to a wider range of artists.

It has also partly to do with cultural ideas of fragmentation being used as a way to represent the sense of an everyday life which is increasingly mediated by a range of technology (computers, video cameras, mobile phones, tablets, all sorts of portable devices, the world wide web etc).

There are various ways in which video and technology are nowadays integrated into live performance and dance. For instance groups like Forced Entertainment and Blast Theory both work with interactive media. Blast Theory is a group of performers and artists who explore interactivity and the relationships between virtual and real worlds by focusing on the social and political aspects of technology<sup>1</sup>. Forced Entertainment have created interactive cd-roms in collaboration with the

---

<sup>1</sup> [www.blasttheory.co.uk](http://www.blasttheory.co.uk) consulted in March 2011.

photographer Hugo Glendinning and Director, Tim Etchells has worked with SMS messaging in a week long performance project. The piece “A Machine To See With” is a film where the viewer plays the lead. One signs up online and hands over their mobile phone number. On the day, an automated call is received providing the address where to go to. On arrival at the allotted street corner the viewer’s phone rings. From there a series of instructions lead one through the city.

Within dance itself the use of new technology is also varied and has seen the creation of different contexts for Dance – like ‘Dance on Screen’ or Video Dance, Gallery based dance video installations, cd-roms and video in live performances. Although there have been many recent technological developments it is important to acknowledge artists like Merce Cunningham and Meredith Monk who had a great contribution in the application of video technology to the dance context.

Merce Cunningham has pioneered the use of choreographic software Lifeforms at the end of the eighties, where a computer generates movement very different from what the human mind and body would create. Cunningham explains how computer technology became vital to his vision of dance:

“I think it could affect choreographers’ experience of movement in the same way electric light first altered the way visual artists saw the world”. The virtual figure of Lifeforms is not bounded by human anatomical limitations, nor by physical laws of gravity etc. “It expands what we think we can do”, he explained. “I think normally the mind gets in the way and says you can’t do that”. As well as a tool for invention, Lifeforms allows him, as a teacher, to transmit movement to his dancers that he can no longer do, not just the visual sense of movement but the processes behind it. “I used to try and have a physical sense of something to convey to dancers”, he said. Now with the physical restrictions of his venerable age, it seems technology is giving him a kind of alternative body with which to continue feeling and exploring movement<sup>2</sup>.

While groups like Blast Theory are exploring and integrating interactive media in the present (now), Choreographer Merce Cunningham, in collaboration with Charles

---

<sup>2</sup> <http://londondance.com/articles/features/merce-cunningham-and-lifeforms> consulted in May 2013.

Atlas, was experimenting with the idea of fragmenting of dance images amongst various screens in 1977. They created the piece “Fragments” (Vaughan, 1992) in that year, - an original choreography made for video which was later reworked for stage – when usually the order of this process would be the opposite. As far back as 1969/1970, Meredith Monk stated she was interested in creating a ‘live movie’. What she did was to appropriate the cinematic properties of film and apply them to a live performance. “...creating a live movie and a work that addressed her fascination with cinematic time and space” (Rosenberg, 2010)

For introducing this thesis, it is important to place it in a context of: models of interactivity – systems, systemic work, mediation, participation, collaboration, interfaces, dance, drawing, video, sound, interaction, multimedia, Digital versus analogue, layers, physical time versus performance and film time, physical space versus virtual space, material (paper ink etc) versus light projection and sound, wearable technology, and to briefly pinpoint artists who are working in relevant ways for the discussion arising.

For the last decades, an increasingly interesting topic of research has emerged in the issue of technology in live performance situations, particularly in the field of Dance and Live Performance.

Some of the main questions at the forefront of this research work are:

How to allow performers to move freely and not constrain their movement or performing ability with technological complications (like wires, and suits and sensors that don't work as they should). I want dancers to be able to do what they do best: Dance. It will be of utmost importance to look at non intrusive technology for dance expression.

Quoting David Hinton on an interview: “A great contradiction between film and dance is that often dance is purely about the freedom to move, and the freedom to move causes a great deal of difficulties for the camera...Then the way I like to work on it is to break the dance down into very short sections and go through it a piece at a time, with all the shots very carefully planned and shoot it in a shot by shot way as though I was making a movie.” (Williams, 2000)

When working with Choreographer Ulysses Dove, Hinton goes on saying “I told Ulysses this was my method of working and he seemed very happy with it, but when it actually came to it, and he saw the painful process whereby the dancers are

only allowed to do little bits of the dance at a time, he didn't really like it at all. What he really wanted was to let the dancers loose to perform the piece, and let the cameras capture it somehow by magic...if you're asking a dancer to do a dance in short sections they're not getting to do what they're good at doing, which is giving a performance" (Williams 2000)

These quotes above summarize in a way the preoccupations and particular difficulties dance film makers have with creating dance films. Nevertheless, what strikes me, as being fundamental for this piece and for this research is the need of creating some structure that allows the dancer to perform freely. I wanted to achieve a situation where there would be no constraints for the performer or for the filmmaker. I was determined not to have to compromise. Understanding the possible problems arising from making a dance film, and having tested some of those during my postgraduate course, the aims of "LFPF" are to combine the strengths of live performance and the strengths of film, allowing them to cohabit in a structure that permits them to co-exist and develop without compromising.

About the making of 'Dead dreams of Monochrome Men (1989) with DV8 Physical theatre, David Hinton says "In those days I had no sense of how punishing it was for those dancers to keep throwing themselves at that wall, so I just kept getting them to do it again and again because I wanted to get another angle...I now realize that it is utterly devastating to be told to do several takes and utterly exhausting." (Williams, 2000)

Having established some of the difficulties in working with dance and technology, it is interesting to develop systematic comprehension abilities in art technology, sound and video art in a live performance context while adopting a questioning attitude about the application of digital technologies to live performance through permanent research attitudes. To understand, analyze and produce new knowledge in a systematic way about the scientific domain of the Art and Science of Digital Arts, Computer Music and interactivity with Image. These processes will be tested in a series of four live performances within the length of this PhD, and the format will be in ephemeral presentations on stage or installation.

## 1.1 Motivation / Objectives

### 1.1.1 Motivation

This research focuses on finding a way to marry video technology, drawing, sound and live performance from the performer's point of view, to enhance the performer's ability to interact with the elements, for the performers freedom to move without technological constrictions. This research is about creating an environment that allows for observation, exploration and education of the performers, through experimentation and experiencing technology brought together reflecting about movement itself. It uses improvisation as a language tool to facilitate a dialogue between technology and live performance. I have looked at live dances in theatres where the video is doing quite the opposite: stopping the dancers from moving effectively, diminishing their size, adding a layer that does not draw from the performers movement but from a 'stage setting'<sup>3</sup> place in the theatre performance.

I am not suggesting this is a wrong approach but that the main motivation and it is crucial for this research project that that was not the case.

It is of interest to create a live performance film that would not start before movement happened (it started with the drawings) and that depended directly on the performer's reaction to each drawing as it was created. The true interactivity of this piece relies on the balanced relationships established between all the elements.

Quoting David Hinton on an interview: "A great contradiction between film and dance is that often dance is purely about the freedom to move, and the freedom to move causes a great deal of difficulties for the camera...Then the way I like to work on it is to break the dance down into very short sections and go through it a piece at a time, with all the shots very carefully planned and shoot it in a shot by shot way as though I was making a movie." (Williams 2000)

About the making of 'Dead dreams of Monochrome Men (1989) with DV8 Physical theatre, David Hinton says "In those days I had no sense of how punishing it was for

---

<sup>3</sup> Carol Brown piece "Nerve" is a good example of a video projection well integrated into a dance performance as stage setting/providing context for the piece.

those dancers to keep throwing themselves at that wall, so I just kept getting them to do it again and again because I wanted to get another angle...I now realize that it is utterly devastating to be told to do several takes and utterly exhausting.”

(Williams 2000)

When working with Choreographer Ulysses Dove, Hinton goes on saying

“I told Ulysses this was my method of working and he seemed very happy with it, but when it actually came to it, and he saw the painful process whereby the dancers are only allowed to do little bits of the dance at a time, he didn’t really like it at all. What he really wanted was to let the dancers loose to perform the piece, and let the cameras capture it somehow by magic...if you’re asking a dancer to do a dance in short sections they’re not getting to do what they’re good at doing, which is giving a performance” (Williams 2000)

These quotes above summarize my motivation, in a way the preoccupations and particular difficulties dance film makers have with creating dance films. Looking at and finding non intrusive ways to have dancers interact with technology is my main motivation and passion. Nevertheless, what strikes me, as being fundamental for this piece and for this research is the need of creating some structure that allows the dancer to perform freely. I wanted to achieve a situation where there would be no constraints for the performer or for the filmmaker. I was determined not to have to compromise. Understanding the possible problems arising from making a dance film, and having tested some of those during my postgraduate course, the aims of the Live Film Performance Facilitator, “LFPP” are to combine the strengths of live performance and the strengths of film, allowing them to cohabit in a structure that permits them to co-exist and develop without compromising.

Another good example that informs the concerns and themes introduced above would be to discuss the text by Susie Ramsay titled

“Bring your body: The Dance Community and New technologies”

(This text was first presented at the National Arts Centre in Mexico City in

November 1994 and later published in *Kunstforum International* #133 Feb-April 1996, edited by Florian Roetzer)<sup>4</sup>.

---

<sup>4</sup> <http://art.net/~dtz/susie.html>, consulted in July 2011.

The author, Susie Ramsay starts by saying that a brief encounter with virtual reality would probably convince most of us in the dance community that we have no part to play in the so-called technological revolution. Russian American anarchist Emma Goldman has a famous quote, "If I can't dance, I don't want to be part of your revolution," which would be an appropriate response to most mainstream VR applications.

This has actually been at the front of this personal research, the absolute need to find creative interaction between live performance and any kind of media or technology that does absolutely not stop the performers from moving freely. That's not always a simple task to achieve.

The author states that confusion and ambivalence about virtual reality predominate in the dance community with standard reactions ranging from skeptical, apprehensive and proudly ignorant to intrigued, excited and hopeful. There is a need to address the assumptions about the field of emerging technologies so that one can distinguish well-founded suspicions from misguided fears and reasonable hopes from absurd expectations. But how does a dancer educate herself/himself on the slippery topic of VR? Is it a thing or an idea, asks the author? Virtual reality is both a technology and a way of thinking and the two are linked.

This is a magazine ad for a VR amusement arcade in the US: 'Because reality sucks. Here's the deal. Reality has toxic waste spills, transmission overhauls and bad hair days. VR, on the other hand, has nothing but totally fun games played in a strange yet stylish headgear. Which would you prefer?'<sup>5</sup>

Although the ad is meant to be funny, it nevertheless reflects an attitude that the VR industry is trying to capitalize on. In the pledges the VR industry makes to seduce us -extending and augmenting our physical body, heightening our senses, traveling in exotic and impossible worlds, flying, mutating and reshaping with

---

<sup>5</sup> Magazine advertisement for "Cybermind Virtual Reality Centers" in the USA, <http://art.net/~dtz/susie.html>, consulted in July 2011.

other people, animals and objects, transforming our identity, intensifying our experience, freeing ourselves from our body, living out all our fantasies. There is an interesting contradiction between the promise to excite the body and, at the same time, the promise to abandon it. What the VR industry is really wanting us to buy into can be summarized in a slogan: better living through more and better technology. It is selling us the fantasy that we can have control over our destinies and that we can escape our conflicted lives all without consequences on our real bodies and on our real lives. The author questions how does the hype about new technologies compare to our experience of them? How often are the promises fulfilled?

Although the video-game industry has applied this model very successfully, it is no big surprise that the VR helmet designed for physically-restricted fighter pilots would translate into a very inappropriate instrument for dance. It is important to reinforce how this helmet would not be suitable for a contemporary dance performance if what is in mind is a non restrictive solution for the dancer.

In a 1993 article in *High Performance*, San Francisco artist and critic Christine Tamblyn talks about 'reality' that cannot be simulated<sup>6</sup>. For instance, in a tattoo the real pain of a needle is an authentic experience and the permanent mark it leaves on our body is both a proof and a reminder of that experience. People are unsatisfied and disillusioned with promises of a pain-free, easy life when the true experience of it includes helplessness, sickness, suffering, aging and dying. A definition of VR that excludes this reality is incomplete. The body might be an intimidating place for the human being to be in the 21st century but it is still one's home.

What do VR's promises offer that is new if there is the possibility to achieve heightened or altered states, to heighten the senses, to visit different psychical spaces and to feel the fluidity of identity? An important social tool throughout history and in all cultures has been this ability to transform one's world, using mediums such as

---

<sup>6</sup> Tamblyn, Christine, "Boy's Club, Craft Hut, Carnival or Cyberspace?," *High Performance*, No. 62, <http://art.net/~dtz/susie.html>, consulted in July 2011.



music, dance, meditation and language. One can either respect or abuse the power this ability of transformation engenders; but clearly any transformation has repercussions.

What is exciting and promising about Virtual Reality for dance is not the helmet paradigm but rather alternative models of reciprocal action concerned with a human-machine interaction that engages more of the body's wide range and variety of physical skills. Currently, a growing group of international artists and scientists are experimenting with interfaces that are more intuitive and that physically and conceptually incorporate the whole body. Myron Krueger is a pioneer in the area of non-encumbered VR experiences and has since the sixties theorized and developed interfaces that have tried to adapt the computer to the human and not vice versa. In the video demonstration for his piece *Small Planet*, a VR piece that lets you fly over a graphical representation of the planet by waving your arms, Krueger explains that he is not going to let us fall and hit the planet until he can find some way to make us feel pain when we do. Technology has a reputation for distancing us from the consequences of our actions, an extreme example would be a fighter pilot dropping real bombs but only seeing video game-like graphics- but this idea of VR tries to bridge the distance between action in the virtual world and consequence in the real world.

Carolina Cruz-Neira, a former dancer, is a VR pioneer and one of the inventors of the CAVE, a VR tool developed in recent years. The CAVE is a room-based immersive audio-visual environment where the roof, floor and walls serve as projection screens. The user moves in this room wearing stereoscopic glasses so that the virtual images appear in 3D. Restrictions include the fact that the sensors measure only head and hand positions and still require a cable connection to the computer. But what is worth noting about this paradigm of interaction is that the body is not displaced onto a screen representation, but participates as a presence in the virtual environment. It reflects a change in thinking: when going to cyberspace, bring your body.

Finally, another VR paradigm investigates not going to cyberspace at all but bringing it to us through 3D holographic projections into real physical space. One way to visualize this is by recalling the scene in *Star Wars* where R2D2 projects a

miniaturized image of Princess Leah who then appears as a presence in the room. Artists such as Michael Naimark, Toni Dove and Rafael Lozano-Hemmer have attempted to achieve this effect. Using a spinning camera, Naimark filmed people in a room and then projected the movie onto the same room with a spinning projector, creating ghost-like presences. Dove achieves a more volumetric illusion by projecting images from various angles onto modeled 3D scrim. Lozano Hemmer, in a telepresence piece, has used intersecting beams of light to indicate the 3D position of remote participants<sup>7</sup>. Ideas of Virtual Reality that reconcile virtual action and real consequence, that insist on the material body and that use real physical space are already more interesting for dance.

The author carries on by saying the dance community should avoid the trap of confusing its dislike and distrust of the uses of technology with technology itself -no matter how much the two seem inextricably linked.

As dance artists, one might find that Virtual Reality is something one can dance to<sup>8</sup>. In some way the video projection being immaterial like a light beam suits this idea very well.

### **1.1.2 Objectives**

One of the very first things that had to be considered in achieving an ephemeral film with LFPP was the difference between live performance and film. Live performance has an ephemeral characteristic that I wanted to introduce in the film; on the other hand, film is pre-recorded and can be watched repeatedly over a long period of time. That is one of the reasons why, the performances done with LFPP are all different, it is important to render the film ephemeral.

The drawings start the performance, and when the performers reacts physically to them, the performance starts, a dialogue is established between dancers and

---

<sup>7</sup> Lozano-Hemmer, Rafael, El Rastro. Presencia Remota Insinuada, Exhibition at ARCO 95 Madrid, February 8-14, 1995, in <http://art.net/~dtz/susie.html> consulted in July 2011.

<sup>8</sup> <http://art.net/~dtz/susie.html> consulted in July 2011.

drawings and the artists making the drawings. The fact the drawing is a projection of light and not physical mark allows the performers to discover the interactions between all this non-physical happenings around him. The establishment of a language between the artist that makes the drawing and the performer interacting with them is one of the most successful ones in the piece. When the performer recognizes the drawings are created next to him, and a visual connection is recognized between the two, then the performer starts also asking for drawings as well as receiving them.

The sound within the use of LFPF system is always one that results from the performance but not directly from the performer movement. Depending on which piece is was tested the sound was being prompted from the colors of the drawings projected onto the dancers, or for instance the audience playing with the speakers and feedback sound in an installation, both of them through a MAX MSP application. The first one was “Untitled 1” and the second one “Bella and the Belly” both pieces by Sonia Rodrigues done to test these ideas, and they will be discussed extensively later in chapter 4. For instance, the sound for the piece “Howling Arm”, also by Sonia Rodrigues, was produced by a gadget created to be worn in both the performer arms and also with the sound of the performer’s voice. Later after the performance was recorded on video, a sound artist was invited to work on the final sound and create a new soundtrack for the final video. On this piece the main test was to create sound within the piece and not to use external sounds from the performance. Again. In chapter 4 this piece will be discussed and explained.

Using the language of film:

One of the difficulties of working with cameras and dancers is the inevitability of the camera becoming an intruder in relation to the dancer’s space. It is a reality that most dancers have more experience in performing on stage and much less experience of performing in front of cameras and the intrusive nature of a camera influences the dance and the dancer’s presence. Because of this and in spite of this fact, on the live film performance “Untitled 1”, the focus of the camera was shifted. Instead of pointing it to the performer, it was pointing at the adjacent space (the white paper on the table) where the drawings were created.

By then projecting that onto the performers, the result was a filtering or a diversion of the attention from the performer's body onto its spatial context by interacting, tampering with it.

By projecting that site/space onto the performer, he became an inhabitant of the film space/screen.

As mentioned in the introduction, the marriage between art and technology gave birth to the art of time. When a piece of Art has a presence in time and space it gains a unique existence.

About film directors Williams states that "The more he's thinking about the relationship between a person and a space, ...then the more he's using the medium of film effectively" (Williams 2000)

So how was this addressed in the performance pieces created for this research? By never giving up for one second on the fact that it was a film being made, a live film but still a film. The Editing concepts used were Jump cutting, the immediacy of editing to construct an image for ex, if the performers were on the left side of the screen, the composition would be compensated with drawings on the top corner right.

Also by having the size of the screen image 'conditioned' by the size of the video projection, as to say: this is the film, this is where it happens. Rapid change of frame (by covering the drawings with a fresh white sheet of paper which resulted on the film stage instantaneously becoming white), as well as by following the principles of frame composition.

"Contemporary dance has been greatly influenced by the language of video, television and the cinema. This is evident in contemporary choreographic practices which mimic the non-linear deconstructionist tendencies of media and the cinematic jump cut. This is remarkably clear in regard to video dance. There are myriad and distinct differences between dance made or re-made for television and the collaborative work of video artists and choreographers created with other ends in mind. As with any history, there are specific works created for the camera that have

come to be regarded as "classics" of the form, such as Merce Cunningham's Blue Studio..."<sup>9</sup>.

When thinking about "Metapolis" – Charleroi Dances/Plan K, a member of the audience can spend a lot of energy just trying to figure out how the technology is working, detracting the audience from enjoying the piece, or once they've figured out there is nothing else to look forward to. The magic is gone. As Ismene Brown reviews the piece in The Daily Telegraph when it was performed at the Edinburgh Playhouse, calls it "dazzling but unmoving (...). This promised to be an extraordinary experience - a meeting of a choreographer and one of architecture's greatest minds, together turning over the rules of space, gravity and balance to reimagine the city."<sup>10</sup>

Another review by Alice Bain on Monday August 27, 2001 states that Metapolis is something more than metropolis. It's a place beyond the suburb and the agglomeration. Brussels-based Charleroi/ Danses - Plan K Company, under the direction of Frédéric Flamand, travels through this sprawling "metapolis", attempting to make something of it.

The result is a vast, ever-changing cityscape of ideas and technical wizardry. Scenes shift from drama to abstraction, light to dark, speed to static, with an angular fluency reflected in a weighty geometric dance style. Flamand pours state-of-the art film and light technology over his choreography; the design is by architect Zaha Hadid. Fourteen dancers dash through an incredible journey, flying along urban highways, passing through a filmic world that juxtaposes apartment dwellings and African huts and works against a soundtrack that looks for emotion amid the alienation.

There are impressive, thoughtful elements in this piece. But it all seems to go past in a bit of a blur. Despite its density, something is missing. Opening with the building of a tall, fragile fence, the scene moves quickly to a Spirograph web of light accompanying men in black shorts. The music here is in a slinky, avant-garde

---

<sup>9</sup> <http://www.dvpg.net/docs/videospace.pdf> consulted in February 2011.

<sup>10</sup> <http://www.criticaldance.com/ubb/Forum16/HTML/000078.html> consulted in April 2011.

1960s style. A couple cross a bridge slowly, while a group of dancers get caught in a block of light.

Out of nowhere, a man in a long greatcoat glides out on pointes, and directs a scene of violence against a backdrop of photos of ordinary people. And so the conveyor belt of discordant life goes on. For the next hour the images and ideas keep coming. A video cameraman follows the dancers, projecting film from specially fabricated costumes on to the back wall with the blue screen technique. Buildings and trees and people move on film cut out of dancers' dresses.

The set also plays an active part. Hadid's trio of silver movable bridges, poised like giant spider legs, but fitting together as if they were a set of occasional tables, adds complexity to the shape of the dance. The dancers push and pull them, glide over and under them. Her fashionably crafted costumes are a mix of spacesuit cling-ons, strange wraps and Gap-style casuals.

Metapolis gives a wired version of urban life. In that the reviewer finds it successful.

Also states that in extrapolating their vision into performance Flamand and Hadid have themselves been caught in the dehumanizing force of the metapolis; they have allowed their work to be swallowed up by its technological temptations <sup>11</sup>

Ismene Brown carries on saying that Zaha Hadid is the grand, idiosyncratic conceiver of buildings that refuse to toe such ordinary lines as right angles and letterboxes, and instead burst in sweeps and furls of glass, metal and light, challenging their inhabitants to keep up mentally with their surroundings. Her architectural practice is eclectic - ski-jumps as well as opera houses - and Metapolis is her 972nd project, hence the name. She collaborated with a Belgian choreographer, Frederic Flamand, whose dance company is formed to explore the integrating of dance and other media. It was an unequal partnership, Flamand's dance outclassed by the design and visual aspects<sup>12</sup>.

One of the strengths of "Untitled 1" relies on the fact the technology is laid out before the audience. By having the table with the live drawing right next to the screen space,

---

<sup>11</sup> <http://www.guardian.co.uk/edinburghfestival2001/story/0,10640,543006,00.html>, consulted in June 2012

<sup>12</sup> <http://www.criticaldance.com/ubb/Forum16/HTML/000078.html> consulted in October 2010

the live ness of it becomes extremely evident, clear and simple. The lay out of the piece is very honest.

It allows the audience to work out quite fast how the relationships are established and gives full access to understanding the mechanics of the technology. By allowing the audience to figure it out before the performers did, it allowed for the creation of a kind of dramatic irony – when the audience sees more of the action than the characters in it.

Also by using the language of film and then turning the film into an ephemeral form:

It is commonly acknowledged that live Dance Performance is an ephemeral art form.

This live film performance was created thinking about performance and dance, not against it. It was of utmost importance to have no constrictions for the performers, and most important the public has full access to the full performance. It has happened to me before when watching a dance film that a close up is showing a small part of what I do not want to see. Because of that, the viewer is sometimes left with a feeling of missing the rest of the action. One thing cameras do effectively is to place and move the viewer, and offer lots of different points of view that would not be possible without a camera, within a specific period of time. However, doing that oblivious to what is happening in front of the camera may at times result in dissatisfaction for the viewer.

If we accept that one of the marriages between technology and dance is the conception of dance made purposely for camera, then I would like to consider for this project that grounded in the marriage of movement and technology is the creation of a ‘video camera + projector’ made specifically for the performance. Instead of thinking about dance for the camera, dance for the technology, I was looking at making the technology setting to work for the performance.

I was impelled to create this setting because of too many discussions going on about dance for the camera. I must say that it was extremely interesting to find an alternative to the need to deconstruct the dance, to break the dance down in pieces in order to take all the required shots.

The demands of asking dancers to perform small pieces of the dance each at the time brought my awareness to a disturbance to the performance flow. For instance, lets

think about a dance piece that has half hour duration; the energy of the dancer and flow of the performance on the first minute has to be different from the same on its 25th minute. The tiredness of the dancer and the sweat, are examples of physical responses the body shows and that cannot be captured if the film is going to be shot in pieces.

Film language also relies on the audience acceptance and understanding of the so-called film conventions. The audience knows there are certain situations that are acceptable and believable in a film screen that could not happen in a live situation.

A good example of this is one related to sound:

“When Roger Thornhill is climbing Mount Rushmore in *North by Northwest* and tense music comes up, we do not expect to see an orchestra perched on the side of the mountain.” (Bordwell 330)

This is because the audience understands and accepts the conventions of film. In regards to this research, it was crucial the performer did not have to make any adjustments to the camera, no breaking down of the performance, the performers made the live film performance by interacting with the film. Interaction, not interference. That is why the film became ephemeral. It was born, developed and finished right there in front of the eyes of the audience. Every single bit of the film existed in that stage; there was no part of the film that came from an external world other than the one in the theatre.

For example, when the piece started, Jorge was lying still on top of the white screen, and a green mark was being drawn next to him. The noise of the pen scratching against the paper made that mark seem larger and more noticeable than without the sound. This is also a characteristic of film, to be able to enlarge a performer movement by adding sound to it. Actually, sound added to enhance a film’s action is the most common type of nondiegetic sound. In film terms and by definition, Diegetic sound is sound which has its source in the story world and Nondiegetic sound is sound coming from a source outside the story world. The interesting twist here is to have applied a filmic tool (the acceptance of enlargement of sounds as a film convention but then instead of using external Nondiegetic sounds to enlarge the gesture I emphasized the live ness of the film by only using the live Diegetic sounds.) To a certain degree, the audience does not think whether a sound is Diegetic or



Nondiegetic anymore because they understand and accept the conventions of film viewing. For instance in the dance film “Motion Control” by Liz Agiss and Billy Cowie, when the body is moving inside a hole in the wall, the sound of the body’s friction with the wall is one of glass/ceramic). The audience does not believe the body is made of glass, but accepts that poetic layer as a metaphor for something else. In “Untitled 1” it was interesting to test this film convention in a live film situation, and see how a poetic layer was added through sound just because it strengthened the idea of the whole experience being live.

## **1.2 Research question**

The main question is on how to achieve a creative solution for non intrusive technology for dance expression and a dialogue between different parts like drawing, video, dance improvisation, interactive performative dialogues and sound. By non intrusive technology one means technology that does not physically interfere with the ability a dancer has to move freely like cables, wires or heavy suits that restrict movement instead of promoting it. Finding a research framework that goes towards this idea is at the forefront of this research as well as testing a system that goes towards this idea of allowing the dancers to perform freely without physical constrictions or barriers.

The main research question is therefore split into several smaller items that will be looked at within the body of this research like where did the interaction between Dance and Technology had its roots?

Starting by looking at Dance Films and how they created a filmic language and questioning on the difficulties as well as the successes of creating Dance Films. Also, the question of how video starts to be integrated in Dance Performances and looking at how it evolved through time up until today?

There is also the question of how video cameras became widely available followed by home computers, up to today and how that shaped the way in which Dance artists worked with integrating technology in Dance practice?

Another pertinent question is how widely available video cameras facilitated the recording of Dance helping with the problem of passing knowledge and choreographies to others, and how they helped with registering Dance?

How does Dance Notation compare to that reality?

Also, how are relevant and recognized Dance and Performance Companies and Dance artists working with film, video and technology and its interaction?

How will original work introduced by Sonia Rodrigues inform and test the question of non intrusive technology for Dance Performances and Dance Artists?

How will a simple system like the Live Film Performance facilitator “LFPPF” test different elements within a Dance and Technology performance like video, improvisation language both performative and drawing, interaction, dialogue, collaborative practices, sound and drawing/painting? How will all the elements work towards a final performance that uses all the items in a balanced way?

How will the several performances created within this research inform and test the ideas exposed in this research question?

What outcomes will arise from all the above points as conclusions or future questions with examples of how it might be pushed forward in the future?

### **1.3 Structure of the thesis**

This thesis has 6 chapters.

Chapter number 1 is the introduction to the thesis, and has three subchapters.

Subchapter number 1.1 talks about the Motivation and Objectives for this research.

Subchapter number 1.2 talks about the research question in this thesis, the main question to be researched.

Subchapter number 1.3 (which is this one) presents the structure of the thesis and how it's organized.

Chapter number 2 contains the research framework of the thesis.

It contains four subchapters.

Subchapter 2.1 is the Historical Overview, covering the history of video dance and technology from 1880 until 2014 with some of the most important and relevant moments in history being mentioned.

Within subchapter 2.1 there is 2.1.1 dedicated to Dance Notation and Choreology, an important issue within this thesis because dance is hard to notate and video became one of the most efficient ways of recording dance when it became available. Nevertheless it's important to talk about how it was before video was widely available. Important as well to talk about notation as an independent subject within dance performance and studies

Subchapter 2.2 is dedicated to the State of the Art, an overlook at the artists and companies and institutions working with concepts relevant to the research of this thesis. It contains a list and description of the most relevant ones.

Subchapter 2.3 talks about Key concepts and practices in Dance and technology

Subchapter 2.4 encloses the chapter 2 conclusions

Chapter 3 talks about the methodology used during the period of research for this thesis

Chapter 4 looks at Original work by Sonia Rodrigues created to test the research question and the ideas discussed over this thesis, as well as the creation and testing of an interactive system called LFPF to enable dancers to interact with their dance environment through the use of drawings that prompt movement and sound in live performance and on stage

It has two subchapters, 4.1 and 4.2

4.1 is about the system created by Sonia Rodrigues called Live Film Performance Facilitator “LFPF”. Within 4.1 there are 5 subchapters about the different elements that constitute LFPF and how they all influence the system, how they have been tested and used together with references to other artists or authors that sustain the work.

4.1.1 talks about the element Video in the system and how it’s used and why

4.1.2 talks about improvisation language in Dance that was used through all experiment pieces during the realm of this thesis research

4.1.3 talks about Interaction, Dialogue and Collaboration in Dance within the mix with technology. Building a dialogue interactive language that was also collaborative was of utmost importance for the success of the pieces to test LFPF as a system and the main basic concepts introduced during this research.

4.1.4 talks about sound in general in live performance and video, and how it was discovered and used in the pieces that tested the ideas of this research

4.1.5 talks about the drawing, how it was used and how the marks came about as being as expressionist, and also how the drawing and colours created an interactive context for the pieces that tested the ideas for this research.

4.2 gives a detailed account on the 3 performance pieces created to test the ideas on this research.

4.2.1 talks about “Untitled 1” by Sonia Rodrigues with a description of the piece, diagram of the system used and images of the performance.

4.2.2 talks about “Bella and the Belly” by Sonia Rodrigues with a description of the piece, diagram of the system used and images of the performance.

4.2.3 talks about “Howling Arm” by Sonia Rodrigues with a description of the piece, diagram of the system used and images of the performance.

Chapter 5 is about the discussion and analysis of the results.

Within this chapter there is subchapter 5.1 which talks about a four month research stay at the DapLab (Digital Arts and Performance Laboratory) Research Centre at Brunel University, London, UK. During this stay at the Brunel research Centre Sonia Rodrigues took part in more than one activities relevant to this research.

They are:

5.1.1 Baltic Movement Conference, New Media New Dance in Gdansk, Poland where Rodrigues presented her research, LFPP was introduced and the performance “Untitled1” was shown on video and discussed by the panel and the public.

5.1.2 Digital Futures Conference in Bournemouth, UK where Rodrigues participated in several workshops and watched lectures

5.1.3 Interactions Labor Saarbrueken, Germany an experimental Laboratory. The International Interaktionslabor in Göttelborn collaborates with XMLab and Centre de Création Choréographique Luxembourgeois TROIS C-L, as well as Donlon Dance Company, on creating a new PERFORMANCE ACADEMY, a shared platform of workshop spaces and research facilities for performance-media design, interactional and wearable concepts, and investigations of gestural processes, protocols, and social choreography.

During this laboratory two pieces were created: “Bella and the Belly” and “The Howling Arm” both by Sonia Rodrigues. They were talked about in chapter 4.

5.1.4 In here the transcription of the Interview to Sonia Rodrigues on Dance and Technology Interaction for the Arts Academy in Saarbrueken Germany

Interviews conducted in the context of the Performance Academy 2011-12, Inaugural workshop August 2011, Campus Goettelborn.

6. Chapter 6 talks about the conclusions and possible Future Work as well as experiments already done.

6.1 This is the chapter of the conclusion a sum up of the key concepts and conclusions and possibilities for the future, a wrap up of the ideas conveyed on the research and also an opportunity to look at where the research might go in future.

6.2 This chapter talks and looks at future work and Examples of different ways of using the system already tested.

There was a Dance Performance, with EDge 2013 (London Contemporary Dance School PG company) and Alem da Danca Dance School on the 7th of June 2013 at Casa das Artes de Famalicao with Live Video by Sonia Rodrigues, reacting to the dancers on stage. The drawings were being made in real time as the show ran. The LFPP system was used to run the video an imagery visual part of the performance. In this particular case the video was being created to react to the dancers on stage. Drawings made by the participants on the show were used as projections as well as simple props in front of the camera. For example white beads were projected when a dancer comes on stage holding lots of white balloons and the beads on the projection where being moved very slowly to convey a sense of liveness to the background and going with the music played. Another example are lots of strips of white paper that were being placed in front of the camera and becoming a three dimensional structure on the stage projection, and it was then during that dance piece being blown to make them move quite slowly to convey a simple sense of poetry and magic to the piece.

#### **1.4 Notes on Methodology**

This project is about creating a situation that allows for observation of the performers, exploring and educating themselves through experimenting and experiencing technology brought together thinking about movement itself. It uses

improvisation as a language tool to facilitate a dialogue between technology and live performance.

How are these objectives realized through the art practice, fieldwork, or reading/writing- and theoretical development of the argument?

There was an apparent interest in a wider question about non intrusive technology for dancers but case studies were also created to enable to focus on a specific example. This was done with the idea of connecting the primary research or reanalysis with the broader theoretical themes and empirical concerns of the existing literature.

The creation of Live Film Performance Facilitator (LFPF) as a tool was part of the methodology used in this research as well as discussing what parts constitute Live Film Performance Facilitator (LFPF).

The creation of three experimental pieces titled “Untitled performance” in May 2010, “Bela and the Belly” in August 2011 “Howling arm” also in August 2011 were also part of the methodology used to test some of the ideas proposed in this research.

Other events like the four month stay (June to September 2011) at the DapLab (Digital Arts and Performance Laboratory) Research Centre at Brunel University, London, UK, as well as the Interaktions laboratory in August 2011 in Germany where the last two pieces mentioned above were created and also there was an interview to several elements of the laboratory amongst others Sonia Rodrigues was interviewed on Dance and Technology Interaction for the Arts Academy in Saarbruecken Germany. This interview comes up in chapter 5, on subchapter 5.4.

These interviews conducted in the context of the Performance Academy 2011-12.

Inaugural workshop August 2011, Campus Goettelborn.

A smaller part of the methodology but not least interesting at this point is to test the LFPF system in future performances and different circumstances with different elements without agitating the good functioning of the whole as a system.

## **2 Research Framework**

### **2.1 Historical Overview**

Within dance the use of new technology is varied and has seen the creation of different contexts for Dance.

From Video Dance, gallery based Dance Video installations, cd-roms, Video in live performances, interactive environments sensor based technology, Dance for the camera, wireless devices motion tracking and capture softwares like Isadora, Life Forms, “Whatever Dance Toolbox”, wearable Technology and garments, motion tracking, to name a few.

As mentioned in several books and lots of professional in the area of Dance share that opinion, Dance and Technology might look like the least likely marriage. As Judith A. Gray, from the San Francisco State University, mentions “Of all the arts, dance would seem the least likely to acede to the vagaries of rapid change and the relentless advances of this modern technology. Dance, the art of human movement, on the surface appears not technologically inclined. It is the self sufficient art...” (Gray, 1989). This is an opinion or a way of thinking about dance and technology which is 24 years old. And although some of it still prevails and a lot has changed since then, what will follow is an historical overview of significant moments, artists and pieces that took us to the present day.

It’s possible to look as far back as the 1880’s when Etienne-Jules Marey from France and Eadweard James Muybridge from the UK start to experiment with sequential photographs in order to study animal motion.

In 1894 Louis Lumière patents the cinematograph which was a tool that combined camera functions with projector. An important Dance film was created in that same year by Thomas A. Edison Films that entailed Ruth Dennis doing a skirt dance outdoors. In 1895 the first film projected to a paying audience in Paris, and the next year 1896 the very first exhibition with the Vitascope, which was a projection version of a Kinetoscope, showing a piece with the Leigh sisters doing the umbrella Dance in New York. In 1899 the first magnetic recording of sound occurs and later in 1903 the



longest film is made to date which was 12 minutes long, by Edwin Porter titled the great Train Robbery. This film has a sequence of square dancing and a man clog-dancing at the same time as other troopers shoot at the immediacy of his feet.

In 1907 August Musger invents slow motion.

In 1912 London has 400 movie houses and round 5 million people in the United States go to the cinema.

1924, Fernand Léger makes “Le Ballet Mécanique”, his landmark avant-garde film in which he experiments with camera created motion and rhythm.

In 1928, Diaghilev uses film projections in Leonide Massine’s ballet “Ode”

In 1929, Mary Wigman’s “Hexentanz” is filmed in Germany

In 1931, Maria Gambarelli is the first dancer to go before a television camera in America

In 1933, Busby Berkeley directs his first musicals (Gold Diggers of 1933, Footlight Parade and 42nd Street) where the dance movement was created by the camera and the editing

In 1940, Walt Disney’s “Fantasia” directed by Ben Sharpsteen, choreographed with animation

In 1943, Martha Graham choreographs and performs “Lamentation” and is directed on 16mm film by Mr. and Mrs. Simon Moselsio, preceded by a brief onscreen discussion of modern dance with critic John Martin

In 1945, Kitty Doner and Pauline Koner begin a dance series on CBS called “Choreotones”

In 1954 Stanley Donen directs one of the first dance films in wide-screen format, “Seven Brides for Seven Brothers” choreographed by Michael Kidd and Matt Mattox

In 1961 Jerome Robbins and Robert Wise direct “West Side Story” with choreography by Robbins and wins an Academy Award

In 1966, “Romeo and Juliet” directed by Paul Czinner using his multi-film-camera technique, stars Margot Fonteyn and Rudolf Nureyev

In 1974, in the television series “Camera Three”, Merrill Brockway directs a program on Merce Cunningham “A Video Event with M.C”, combining four screens showing the same dance from different angles

In 1975, Videographer Charles Atlas and Merce Cunningham collaborate on “Westbeth”

In 1977, American Ballet Theatre's Nutcracker, choreographed by Mikhail Baryshnikov and directed by Tony Charmoli, who used a handheld small camera to walk into the action, airs on NBC

In 1978 Meredith Monk's "Quarry" is performed by her group The House and directed by Amram Nowak. Also in 78 a collaboration between Merce Cunningham and Charles Atlas called "Torse", uses two synchronous films projected simultaneously on adjacent screens. The continuity between the two is achieved by chance

In 1982 Charles Atlas directs "Channels/Inserts for the Merce Cunningham Dance Company

In 1986, Elliot Caplan directs "Points in Space" for Merce Cunningham Dance Company

In 1990, "Dead Dreams of Monochrome Men, choreographed by Lloyd Newson/DV8, is reworked for the screen by film director David Hinton

In 1992, Peter Greenaway directs the film "Rosas" choreographed by Anne Teresa de Keersmaeker.

The series "Dance for the camera" is launched by The Arts Council of England and the BBC by Bob Lockyer and Rodney Wilson. Original dance films are made collaboratively by teams of choreographers and directors for television

In 1993 Philippe Decoufle choreographs and directs "Le P'tit Bal" and is performed by him and Pascale Houbin

In 1994, Anne Teresa de Keersmaeker choreographs and directs "Achterland", performed by her company Rosas

In 1996, directed by Elliot Caplan, "CRWDSPCR" is choreographed by Merce Cunningham using the computer program Lifeforms

In 1999, Bill T. Jones collaborates with Paul Kaiser and Shelley Eshkar on "Ghostcatching" an innovative virtual dance created using motion capture technology (Mitoma, Brooks, 2002)

Random Dance Company has created several performances that integrate video, light design and dance and are concerned with an interdisciplinary research process.

In 1997 Random Dance Company created The Millennium

Here is a review from The Guardian written in September 29 1997

"...the brilliant way Wayne McGregor converts dancers into virtual bodies in Millennium-apparently transforming them into creatures of light and electricity that exist only on a giant computer screen... Aspects of McGregor's dance sustain this eerie virtuality with their staccato twitches and odd, attenuated shapes (all precision-danced by a fabulous cast)."<sup>13</sup>

In 1998 Random Dance Company created Sulphur 16.

Here is a review from The Guardian written in February 27 1999.

"The pressure of dance invention is unrelenting... driven by an imagination that's clearly not of the 20th century, but of the new millennium. There are moments in Sulphur16 where we look directly into the future of dance."<sup>14</sup>

2000 – Aeon - Random Dance Company

The Guardian, May 18 2000

"...in Aeon, McGregor and his design team take us even deeper into the future, with an integration of dance, lighting and graphic animation creating the stuff of science fiction movies.....[McGregor] could easily settle for being the techno boffin on dance, but instead he carries on improving as a choreographer. However technologically literate he is, McGregor's basic inspiration still seems to be the old fashioned software of human bodies."<sup>15</sup>

Random Dance Company has since then created several performances that integrate video, light design and dance and are concerned with an interdisciplinary research process.

A few more examples of this integration are performances like Eden in 2005, Erazor and Skindex in 2006, (memeri) and Genus in 2007, Infra and Entity in 2008, FAR in 2010, UNDANCE in 2011, Aomos in 2013.<sup>16</sup>

The group BADco for instance created pieces like Man.Chair (2000), 2tri4 (2001), Diderot's Nephew or Blood is Thicker than Water (2001), Solo Me (2002), RibCage

---

<sup>13</sup> [http://www.randomdance.org/productions/wayne\\_mcgregor\\_past/the\\_millenarium/press](http://www.randomdance.org/productions/wayne_mcgregor_past/the_millenarium/press) consulted in October 2013

<sup>14</sup> [http://www.randomdance.org/productions/wayne\\_mcgregor\\_past/sulphur\\_16/press](http://www.randomdance.org/productions/wayne_mcgregor_past/sulphur_16/press) consulted in October 2013

<sup>15</sup> [http://www.randomdance.org/productions/wayne\\_mcgregor\\_past/aeon/press](http://www.randomdance.org/productions/wayne_mcgregor_past/aeon/press) consulted in October 2013

<sup>16</sup> <http://www.randomdance.org/productions> consulted in October 2013

(2002), Walk This Way (2003), Mass (for Election Day Silence) (2003), Deleted Messages (2004), Fleshdance (2004), memories are made of this... performance notes (2006), Gravitation (2006), Changes (2007), 1 poor and one o (2008), The League of Time (2009), SEMI-INTERPRETATIONS or how to explain contemporary dance to an undead hare (2010), Point of Convergence (2010), Responsibility for Things Seen, Tales in Negative Space (2011), Black and Forth (2012), TVolution will not be televised (2013), A Pound of Hysteria, Acceleration... – melodrama (2013), Broken Performances (2013).<sup>17</sup>

### **Notes on Dance Notation**

One of the important issues to touch within the context of this thesis and within the Dance world is Dance notation. According to Judith A. Gray from the San Francisco State University in California (Gray, 1989) the first tries to explore collaboration between Dance and computers were in 1960s at the University of Pittsburg. The person in charge of this project was Jean Beaman and it consisted of codifying and manipulating the choreographic process with a computer that had an extremely large memory capacity. Apparently the results of these experiments were never shown or published.

As Thomas W Calverts from the Simon Fraser University, in British Columbia, Canada, mentions, “Our culture is largely movement illiterate: dance for example, has been described as an illiterate art. We are accustomed to rather loose descriptions of human movement, particularly day-to-day activities, and we generally do not have the vocabulary or the discipline to describe it precisely. Th need for more accurate terms has recently come into focus in filmmaking, where the traditional scripts and storyboards were found to be inadequate” (Calvert, 1989:p7). Here is a brief context of Movement notation systems, which within the spectrum of this thesis will not be fully explored but it’s nevertheless important to put them in place and mention them chronologically. Historically speaking Schefen developed in 1974 and Birdwhistell in 1970 developed a system to characterize movement is being

---

<sup>17</sup> <http://badco.hr/badco/> consulted in July 2013

used in interpersonal communication. For common use amongst other special principle systems only three were in common use around the end of the fifties and beginning of the sixties. Those were Benesh Notation, EskolWachmann Notation and Labanotation (Gray, Calvert, 1989:p7). Labanotation has been extensively used as well as Benesh, being the first one more popular in the USA and the second in the UK. Notation then developed into Computer interpretation of notation, which will not be extensively discussed on the realms of this thesis but needs to be pinpointed as it is important to the development of the use of computers and specific softwares as tools for choreographic and creative production in dance choreography.

Video became very helpful on the recording and keeping of Dance. As it could be witnessed from the chronology on the previous chapter it was not long ago Dance had access to filming performances and also for film to be used as an educational and way of passing Dance onto next generations.

I will introduce as a notation discipline. “The word ‘choreology’ means the knowledge and scholarly study of dance, core knowledge in them and about them, and diverse scholarly methods essential to that study. Choreological studies is a branch of choreology.

Choreologists are essentially practical scholars in the sense of being practitioners in one or more of the interlocking domains of dance. They may be found practicing as choreographers, teachers, performers, notators, reconstructors, researchers, critics - essentially wherever cognitive and corporeal knowledge is required.”<sup>18</sup>

One of the striking issues for me was the one of the relationship between movement and framing that movement (body) with a video camera. Also choreology provided my videos with an underlying structure based on the movement itself. The striking discovery for me was to find this structure for film that not only deals with the relationship of the body with the space where it moves, but also on the qualities of the movement itself. The issue of what to capture while shooting or editing became a lot clearer and varied. Also it provided me with a very strong link between other

---

<sup>18</sup> <http://www.narthaki.com/info/articles/article66.html> consulted in July 2013

subjects I studied before (like geometry, modulation of space, visual communication etc) and the human movement.

On stage, dancers are seen in movement against the background of a static stage setting. One of the reasons I think this happens is because of the size of the stage, which contains the dancers. The stage works as a frame for the dance. In film it can also work that way but the movement of a person moving down the street being shown by a camera that is accompanying the person's movement down the street is less perceived. Movement against movement is harder to perceive than movement against stillness. I consider the frame of the video to be the stage in my work. By using video I can choose what is inside of that frame, but more importantly it is easy to make objects or people appear and disappear, which gives those objects or people the same qualities of the actor on stage.

The images on a video screen are a combination of the interaction between spaces, stage settings, dancers and objects, and also the interaction between the camera movement and all of those. All this forces that work together can facilitate a very special context for dance video.

How does choreology inform this?

When a dancer jumps on stage, we know he is jumping because of the relationship the body has with the whole of the stage. When he jumps he gets further away from the floor and we read this movement in relation to the floor plane. This is how we know whether the jump was extremely high or low. Also when the body turns around itself we see it clearly. And again we see this in relation to the whole space. What we don't see is the effort the dancer is making, which muscles he is using or where/why in the body is the movement starting.

This is how choreology has helped me. It gave me a vocabulary and a structure of analysis of movement, so that I can choose which aspects to show when I record a dancer, or edit footage.

## **2.2 State of the Art**

This is a list and some history or short bibliographies of Dance and Technology artists, companies and organizations that have work that informs and contextualizes this thesis. They are also in tune with the concerns explored in the performance pieces by Sonia Rodrigues, created for the construction of this thesis discourse. These examples that follow are very much aligned with Rodrigues research and practical creative and research performances and thought process.

### **Companies, Organizations and Artists**

The list of descriptions about these companies and organizations as well as biographies from Artists can be found in Annex 1

## **2.3 Key concepts and practices in Dance and Technology**

This is based on the text BRING YOUR BODY: THE DANCE COMMUNITY AND NEW TECHNOLOGIES by Susie Ramsay which introduces the theme of some of the key concepts in Dance and Technology in a very clear way for the context of this research.

(This text was first presented at the National Arts Centre in Mexico City in November 1994 and later published in Kunstforum International #133 Feb-April 1996, edited by Florian Roetzer).

The author, Susie Ramsay starts by saying that a brief encounter with Virtual Reality, VR, would probably convince most of the people in the dance community that there is no part to play in the so-called technological revolution. Russian American anarchist Emma Goldman has a famous quote, "If I can't dance, I don't want to be part of your revolution,"<sup>19</sup> which would be an appropriate response to most mainstream VR applications.

---

<sup>19</sup> <http://art.net/~dtz/susie.html> consulted in January 2010.

This has actually been at the front of this research, the absolute need to find creative interaction between live performance and any kind of media or technology that does absolutely not stop the performers from moving freely. That's not always a simple task to achieve.

The author states that confusion and ambivalence about virtual reality predominate in the dance community with standard reactions ranging from skeptical, apprehensive and proudly ignorant to intrigued, excited and hopeful. There is a need to address any assumptions about the field of emerging technologies so that one can distinguish well-founded suspicions from misguided fears and reasonable hopes from absurd expectations. But how does a dancer educate herself/himself on the slippery topic of VR? Is it a thing or an idea? Virtual reality is both a technology and a way of thinking and the two are linked.

This is a magazine ad for a VR amusement arcade in the US: “Because reality sucks. Here's the deal. Reality has toxic waste spills, transmission overhauls and bad hair days. VR, on the other hand, has nothing but totally fun games played in a strange yet stylish headgear. Which would you prefer?”<sup>20</sup>

Although the ad is meant to be funny, it nevertheless reflects an attitude that the VR industry is trying to capitalize on. In the pledges the VR industry makes to seduce us extending and augmenting our physical body, heightening our senses, traveling in exotic and impossible worlds, flying, 'morphing' with other people, animals and objects, transforming our identity, intensifying our sexual experience, freeing ourselves from our body, living out all our fantasies, etc., there is an interesting contradiction between the promise to excite the body and, at the same time, the promise to abandon it. What the VR industry is really wanting us to buy into can be summarized in a slogan that has been heard before: better living through more and better technology. It is selling the fantasy that we can have control over our destinies and that we can escape our conflicted lives all without consequences on our real bodies and on our real lives. But how does the hype about new technologies compare to our experience of them? How often are the promises fulfilled?

---

<sup>20</sup> <http://art.net/~dtz/susie.html> consulted in January 2010.

<sup>64</sup> <http://art.net/~dtz/susie.html> consulted in January 2010.



Although the video-game industry has applied this model very successfully, it is no big surprise that the VR helmet designed for physically-restricted fighter pilots would translate into a very inappropriate instrument for dance.

In a 1993 article in *High Performance*, San Francisco artist and critic Christine Tamblyn talks about “reality that cannot be simulated”<sup>64</sup>. She goes on saying that for instance in a tattoo the real pain of a needle is an authentic experience and the permanent mark it leaves on our body is both a proof and a reminder of that experience. One can be unsatisfied and disillusioned with promises of a pain-free, easy life when the experience of it includes helplessness, sickness, suffering, aging and dying. A definition of VR that excludes this reality is incomplete. The body might be a scary place for humans to be in the 21st century but it is still the home.

What do VR's promises offer the performer that is new if one has and always have had the possibility to achieve heightened or altered states, to augment the senses, to visit different psychological spaces and to feel the fluidity of identity? An important social tool throughout history and in all cultures has been this ability to transform one's world, using mediums such as music, dance, meditation, language and even drugs. One can either respect or abuse the power this ability of transformation engenders; but clearly any transformation has repercussions.

What is exciting and promising about Virtual Reality for dance are the alternative models of reciprocal action concerned with a human-machine interaction that engages more of the body's wide range and variety of physical skills. Currently, a growing group of international artists and scientists are experimenting with interfaces that are more intuitive and that physically and conceptually incorporate the whole body. Myron Krueger is a pioneer in the area of non-encumbered VR experiences and has since the sixties theorized and developed interfaces that have tried to adapt the computer to the human and not vice versa. In the video demonstration for his piece *Small Planet*, a VR piece that lets you fly over a graphical representation of the planet by waving your arms, Krueger explains that he is not going to let us fall and hit the planet until he can find some way to make us feel pain when we do. Technology has a reputation for distancing us from the consequences of our actions -an extreme and frightening example is a fighter pilot dropping real

bombs but only seeing video game-like graphics- but this idea of VR tries to bridge the distance between action in the virtual world and consequence in the real world.

Carolina Cruz-Neira, a former dancer, is a VR pioneer and one of the inventors of the CAVE, a VR tool developed in recent years. The CAVE is a room-based immersive audio-visual environment where the roof, floor and walls serve as projection screens. The user moves in this room wearing stereoscopic glasses so that the virtual images appear in 3D. Restrictions include the fact that the sensors measure only head and hand positions and still require a cable connection to the computer. But what is worth noting about this paradigm of interaction is that the body is not displaced onto a screen representation, but participates as a presence in the virtual environment. It reflects a change in thinking: when going to cyberspace, bring your body.

Finally, another VR paradigm investigates not going to cyberspace at all but bringing it to us through 3D holographic projections into real physical space. One way to visualize this is by recalling the scene in Star Wars where R2D2 projects a miniaturized image of Princess Leah who then appears as a presence in the room. Artists such as Michael Naimark, Toni Dove and Rafael Lozano-Hemmer have attempted to achieve this effect. Using a spinning camera, Naimark filmed people in a room and then projected the movie onto the same room with a spinning projector, creating ghost-like presences. Dove achieves a more volumetric illusion by projecting images from various angles onto modeled 3D scrims. Lozano Hemmer, in a telepresence piece, has used intersecting beams of light to indicate the 3D position of remote participants. Ideas of Virtual Reality that reconcile virtual action and real consequence, that insist on the material body and that use real physical space are already more interesting for dance.

At a conference on virtual art in Madrid, artist and VR engineer Will Bauer reminded us that the human body is the real sophisticated high-tech device: manmade technology is really very simple and crude at present when compared to the biological technology produced by genetic evolution. As dancers, we can consider ourselves experts at certain physical and mental skills that are now the focus of much VR research. In our training, we are constantly asked to receive and process highly complex information. We learn to perceive the connection between body and self as fluid in order to achieve certain physical tasks in time and space: using visualization

we continually redefine the body map and its boundaries, destabilizing and reconstructing our perception of self. We continually train our senses of vision, hearing, smell and touch; and our proprioceptive sense and our vestibular system are exceptionally developed. (Definition of proprioception: Although Common thought would have us believe that we have only five senses, we in fact have six. This sixth sense is what is known as proprioception. Proprioception is a non-conceptual, holistic and usually unconscious sense that gives us information regarding the location, movement and posture of our bodies in physical space. This information is gained by sensory receptors found all over our bodies and helps us to keep and maintain what is known as our body schema. Our body schema is our unconscious map of our bodies, almost like a plan inside our heads that tells us where our different body parts are.) The proprioceptive sense allows us to know our limb and body position in space and in relation to one another; whereas our vestibular system tells us whether there is any change in their velocity. The field of VR is developing sensors and displays so that, according to VR researcher Warren Robinett, these sensed and imperceptible phenomena 'can be rendered visible, audible or otherwise perceptible to a human being.'

The author carries on by saying the dance community should avoid the trap of confusing its dislike and distrust of the uses of technology with technology itself -no matter how much the two seem inextricably linked.

Also finishes by stating that dance artists might find that Virtual Reality is something they can dance to<sup>21</sup>.

Reflecting on human machine interaction and in this particular case of dance, two good examples come to mind Claudia Roble's work and also Suguro Goto's work. Claudia Robles piece Seed/Tree (audiovisual Installation/Butoh performance with live-electronics). Her work is known worldwide, having participated in several group and solo exhibitions around the globe, for example at the Bauhaus-archive Museum fuer Gestaltung in Berlin, Germany (2003); the European Capitals of Culture: Sibiu and Luxemburg (2007); Enter3 in Prague, Czech Republic (2007); the International

---

<sup>21</sup> <http://art.net/~dtz/susie.html> consulted in January 2010.

Computer Music Conference ICMC in Copenhagen, Denmark (2007) and Montréal, Canada (2009); at the SIGGRAPH Asia 2009 in Yokohama, Japan (2009) and lately at the DRHA 2010, Brunel University in London, UK.<sup>22</sup> A closer look at the first piece mentioned here titled *SEED /TREE* (2005) Installation/Butoh Performance/Live Electronics, will be taken. According to the Brunel University website when talking about this piece, Butoh is a modern expressive dance-form created in Japan in the 60's, traditionally performed in white-body make-up and the movements are very slow and expressive. The movements in this dance form come from the inner world, therefore emerging from within and not be imposed from without. During a performance, the Butoh dancer is in a state of 'hyper-presence', he is aware of everything around him and within his own body.

This installation-performance consists on a forest environment created by some panels projected by haptic images from tree cortex and human skin. Haptic images in this context are: HAPTIC from (the Greek word: HAPTOS - tactile): the sensation "to feel": the feeling that one can 'touch' with the eyes. There are three Butoh dancers in the space performing the process of a seed growing to become a tree. Each performer moves in his/her own way representing the same subject asynchronously. The dancers have each their own movements, which are the product of their own imagination. The installation runs for three hours. The dancers develop the main subject in twenty minutes, then they lie for ten minutes on the floor and afterwards they repeat the process from the beginning. During this time, the performers have the necessary time to experience their own imaginary world combined with the outer space created by the sound and video projection. There is a continuous feedback between the dancers and the media; the translation of emotional physiological parameters to sound and video, however, gives feedback not only to the dancers but also to the spectators. In *Seed/Tree* the dancers produce and transform the sound and the audience control the video projections. The results are instantaneous creations, expressions of the moment, with image, movement and music forming living signs in space.

---

<sup>22</sup> <http://people.brunel.ac.uk/bst/vol1001/claudiarobles/> consulted in December 2013.

According to the website where this information was retrieved, there are two types of interactivity in this performance. The first one is the interaction between dance and sound: the performers have microphones and EMG electrodes attached to their bodies. The breathing and the heartbeat of two of the performers produce sounds that are continuously modified by the muscular tension of a third dancer. The second type of interactivity is that between the installation space and the visitors. During the performance, visitors can walk freely around the virtual forest. There is a video observing the installation space and human presence influences the video projections; these interactions create subtle differences of the video on the panels. The installation space itself becomes aware of the visitors and reacts according to their movements. In this way the visitor is invited to be part of the environment. For Seed/Tree, a wireless EMG (electromyogram) interface was developed by Frieder Weiss. This interface has three pairs of electrodes, which are attached to three different muscles. This interface measures the muscle tension, while the program sends the values as a continuous OSC packet that is received through an OSC-route object in the MAX program; then, each value is used to trigger different sound effects in MAX/MSP. The EMG electrode attached to the Butoh dancer.<sup>23</sup>

This is a crucial example of a dance and technology setting that has results, and because of the electrodes attached to the dancer would be classified within this research as intrusive technology for dancers. One of the main issues of this research was to find and look at solutions that were non intrusive, and that is why it's so important to find successful cases with a different approach. One of the major questions in this research will always be how to not stop dancers from doing what they do best which is to dance. And in a way, Butoh by being a really slow meditative practice resolves a part of this problem because of its slow characteristics. In a way these performances are quite slow and meditative. I would love to see these systems working on a full blast fast dance performance.

Suguro Goto presents himself as another good example of what was talked about above and in many ways has touching points with Roble's work.

---

<sup>23</sup> <http://people.brunel.ac.uk/bst/vol1001/claudiarobles/> consulted in December 2013.

According to the Artist's website, Goto's work is based on the idea of performance on the context of new media, dance, music, and images. On the piece titled "Duali" the controllers of gestures and other continuations, such as Wifi and programming are originally developed. Using this, the work explores the potential in the relationship of man and machine. This performances specially explore the interaction between the body of the performers and the video images as well as the body of the performers and the image and architectural/lightning-like image on stage, which can transform in real-time, thanks to the BodySuit.

The concept of the piece also taken from the artist's website states it is based upon the concepts of Dualism. None of them intend to show superior or inferior, however both of them interact with each other. For example, with its two dancers (which seem to be opposite characters), it expresses the interaction between the video representation and the real bodies which is represented on stage. For example, the stage of performance is regarded as space – architecture / time – body. The dancers consist of female – male / man – machine, and like these, the work expresses its ideas that seem to conflict with each other, but as a matter of fact, they co-exist. The images consist of only white - black, and augmented body – virtual space, the music are sound – noise /expression – abstract, the choreography is meant for rationality – perception / body – machine. One can extend these abstract "dualistic" ideas into the conjunction of geographic and cultural mixtures between Asia and Europe, as well.

On the Artist's website one can get information about the piece, Dualism and this is the explanation given about the Suits used on the piece:

*"Detailed Description of the Gesture Controller – "BodySuit"*

*"BodySuit" is a name of the motion captured system and it intended for the use of the specific use of performance. This has 12 sensors, which are placed on each joint of the body, such as a wrist, an elbow, a shoulder on the left and right arm an ankle, a knee, and the beginning of the left leg and right leg. The sensors are placed on the outer sides of the arms and on the front sides of the legs and fixed on a suit. Furthermore, there are the IMU sensors, which are the combination of gyro and accelometer. The sensors are connected with Arduino, and the Wifi system sends the signals to a computer. At last, the signals of OSC are transmitted to the several computers with Max/MSP/Jitter and Processing in order to generate sound and image in real time. This gesture doesn't have to be based upon playing a traditional*

*controller or instrument, but could be liberated to become a larger gesture, like a mine. This allows for collaboration with a person in a different field, for instance a dancer or an actor. The audience easily observes this larger movement, which is different from the movement by fingers like performing an instrument. That is to say it can be well adapted to a performance and musical theater situation. Since this is not like a physical controller or instrument, which is held by hands, it allows to be collaborated with the idea, " Augmented Body" or "Extended Body" in the work. His body is amplified by electric signals to control something remotely or to be extended from his abstract gesture to a meaningful gesture.”<sup>24</sup>*

This example is as important as Claudia Roble’s example where the dancers or performers are heavily geared with suits that in one hand provide computers with data but in the realms of this research purpose constrict the movement of the dancer. They are great examples of what one does not mean by non intrusive technology.

## **2.4 Chapter Conclusions**

One of the very first conclusions that comes out quite clearly from this chapter is the variety of ways in which Dance Artists and companies are interacting with technology.

From Video Dance, gallery based Dance Video installations, Video in live performances, interactive environments sensor based technology, Dance for the camera, wireless devices motion tracking and capture softwares like Isadora, Life Forms, “Whatever Dance Toolbox”, wearable Technology and garments, motion tracking, to name a few.

As mentioned before, on the historical overview, one can look as far back as in the 1880’s as Etienne-Jules Marey from France and Eadweard James Muybridge from the UK start to experiment with sequential photographs in order to study animal motion. In the late 1800’s important Dance films were created as being the very first experiments in this area like for instance as far back as 1928, Diaghilev uses film projections in Leonide Massine’s ballet “Ode”. These are lots of examples in the

---

<sup>24</sup> <http://suguru.goto.free.fr/Contents2/Duali/Duali-e.html> consulted in November 2012.

Historical overview as well as in the State of the art chapters of how Dance and Film started cohabiting. And it then moves onto how Artists, companies and institutions have been researching and testing how Dance and technology interact.

The joint venture between video and Dance carries on for a long while going through examples like in 1996, directed by Elliot Caplan, “CRWDSPCR” is choreographed by Merce Cunningham using the computer program Lifeforms. This is an example of how a computer software informs and helps creating Dance.

For instance the Australian Dance Theatre explored the relationship between robotic and human performers within an artificial ecosystem. Imbued with ritualized process the company has explored mutualism, territoriality, parasitism, predation, symbiosis and senescence to suggest that in the midst of technology we remain subject to the instincts of the flesh.

The Musical Gestures project conceived a research project on music-related gestures, based on the conviction that there are intimate links between music, understood as sonic art, and gestures, understood as human bodily movement. The Open Ended Group has a pioneering approach to digital art frequently combines three signature elements: non-photorealistic 3D rendering; the incorporation of body movement by motion-capture and other means; and the autonomy of artworks directed or assisted by artificial intelligence.

Film Directors with choreographers have made film versions of dance stage shows and many companies mentioned in the state of the Art have a huge interest in pushing the boundaries of choreography and film.

One on hand there are Research Centers included in University Departments like the DAP-Lab, Brunel University London for instance, dedicated to exploring convergences between performance, telematics, textile/fashion design and movement, clothing and choreography, visual expression, film/photography, and interactive design. Establishes research partnerships connects ongoing research investigations and productions in dance with performance/science collaborations and brings these partnerships into knowledge transfer with performance, multimedia and electronics engineering research. This is a model that can be found in lots of research centers amongst university departments.



On the other hand there are institutions like EMPAC at the Rensselaer Polytechnic Institute dedicated to building bridges between the human senses, to modes of perception and experience, to creating meaning in a physical environment, and to the intangible world of digital technology. Promotes engagement in research areas such as augmented reality, virtual reality, scientific visualization, audification, haptics, human/machine interfaces and interaction, auralization, and multi-modal modeling in large-scale, fully media-integrated environments. Performance and technology examples have been shown on a stage environment as well as in gallery based installations. Also in research environments as well as Artistic environments. The question of the body is a very poignant one when looking at dance practices therefore technologies like wearable garments embodied with technology was also looked at and a very important one. One of the very first sentences of this thesis is about how fast the last century shaped an electronically linked planet and that is reflected in the rapid expansion of art practices. This research was contextualized within a place of: models of interactivity – systems, systemic work, mediation, participation, collaboration, interfaces, dance, drawing, video, sound, interaction, multimedia, Digital versus analogue, layers, physical time versus performance and film time, physical space versus virtual space, material (paper ink paint etc) versus light projection and sound and wearable technology.

The examples given up until now and the Artists, Companies and Institutions talked about go towards one of the most important points of this thesis. And some of them go against that idea in order to create a comparison and a debate between ideas conveyed. The main idea being how to allow performers to move freely and not constrain their movement or performing ability with technological complications (like wires, and suits and sensors that don't work as they should). It was of utmost importance to find examples of non intrusive technology for dance expression.

The elements looked at were conclusively models of interactivity and systems, participation, collaboration, interfaces, dance, drawing, video, sound, interaction, multimedia, layers, physical time versus performance and film time, physical space versus virtual space, material (paper ink etc) versus light projection and sound and wearable technology.

All of the above mentioned in this conclusion will be expanded and integrated further into this thesis particularly on chapter 4 where original performance pieces created

for the purpose of this research will be talked about. The concepts introduced and talked about in chapter 2 will unfold in practical terms when talking about practical examples by Sonia Rodrigues to test this same ideas of non intrusive technology for Dancers.

### **3 Original Work**

It is the intent of this project to encourage Dance, Performance and Sound Artists to think abstractly about video/sound technology instead of the technical barriers that generally come with not knowing how to operate it. 'LFPP' is proposing to develop a new approach to relationship between performer, stage and sound better still between performance and its special environment/context. It offers innovative possibilities without being intimidating. Once in place (once set up) it provides a new approach for artists to collaborate, it provides a common ground for Dance Performance and Fine/Sound Artists to merge their skills through experimentation with a live performance as the ultimate goal.

It is only natural that the marriage between these elements is going to create an increasingly fluid language for the future. It is essential to think about creating a performance language which supports the ideas of artists, therefore the technology at the service of the artists and never the other way around. That is the idea when I refer to technology as a tool for developing creativity.

#### **3.1 Live Film Performance Facilitator (LFPP) as a tool**

Objectives for the Live Film Performance Facilitator (LFPP):

This thesis introduces a powerful tool, which I called 'LFPP' – Live Film Performance Facilitator which tests and provides a new approach to the relationship between live performance, film and sound when combined in live performance situations. It enables the use of improvisation as performance language, giving birth to a constructive dialogue between video technology and live performance.

'LFPP' is a structured environment for exploration of movement through film concepts with the input given by drawings. It enables a live video to develop in front of the audience. It enables the performers to inhabit a truly responsive environment that changes depending on their reaction. It is a two-way dialogue between performers and spatial context powered by a second performer inputting drawings. It also frees the performers from directly having to manipulate any technology and

deal with just the artistic result of it. It is therefore a human mediated technological environment. On the other hand, the sound responds to the drawings through a computer mediated application called "colorasom" which was developed by a Phd colleague Andre Baltazar. His Master's thesis was called "Extraction of rhythmic movement information in dance through a video signal". "Colorasom" uses visual computational algorithms that allow real time analysis of what is being drawn. Depending on the colors used and their disposition on the screen, the program executes different sounds (pre-determined samples) allowing therefore to the Artist to control de visual and sound aspect of the piece through the drawings.

The elements that that constitute LFPP are:

Video:

1-Screen on the floor made of large strips of white paper

2- Video camera

3-Video projector

4-Table covered with same white paper of the screen

5-Strong light above the table Sound:

1- laptop with Colorasom application

2- webcam

Please refer to Figure 20 on the next page – it is a sketch of how the different elements were positioned in space.

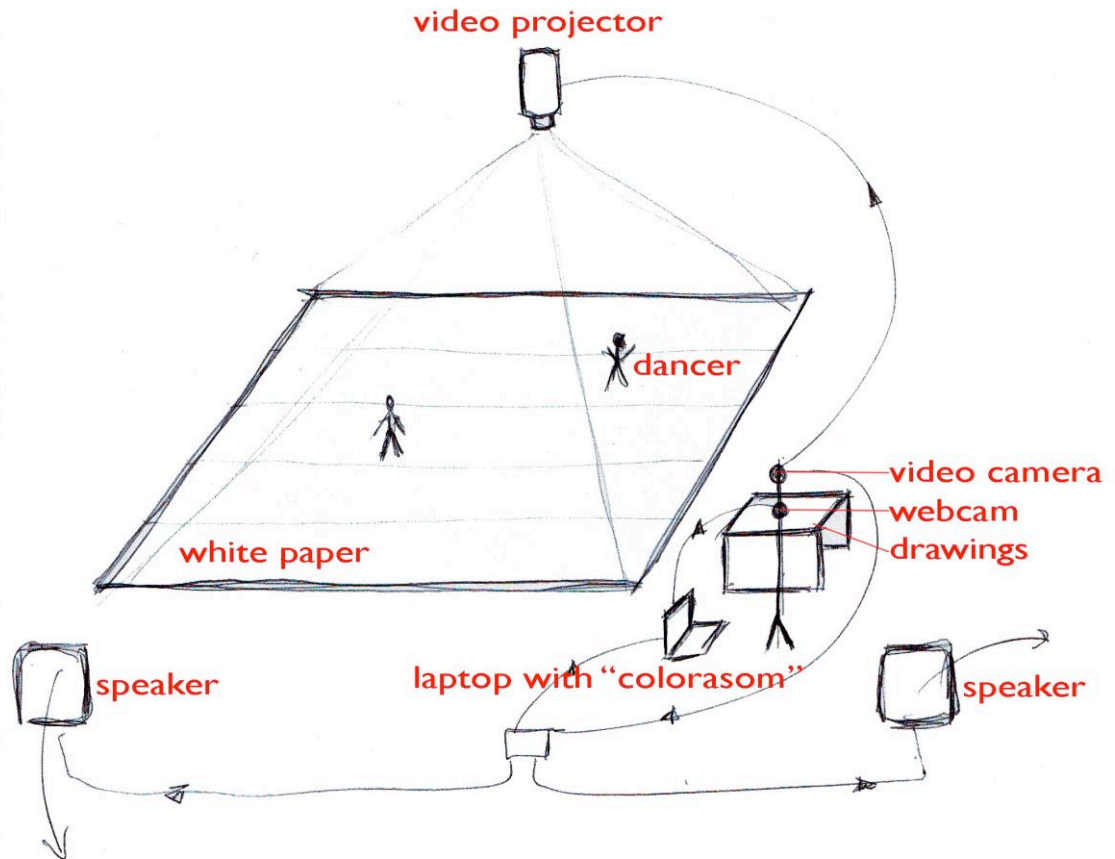


Figure 1 The system LFPF + Untitled 1 performance

Technology of any sort can be seen as a tool for developing creativity. One of the Dance Companies inspire this statement is Random Dance Company with pieces like “Sulphur 16” and “Aeon”<sup>25</sup> which makes believe in the true marriage between technology and live arts. Aeon for instance is an integrated, multi-media performance for eight dancers and their virtual partners, Aeon (earth/air) takes place in virtual, physical and screen-based space. The piece is presented in three parts. The first is an animated solo made on Wayne McGregor in collaboration with animator Timo Arnall. The second is a combination of real and digitally projected dancers - stunning effects creating a new reality, and in the third the dancers perform

---

<sup>25</sup> www.randomdance.org consulted in May 2011.

Wayne's lightning speed choreography and idiosyncratic movement vocabulary, bringing the performance back to the body and questioning ideas about its limitations and extremities

It has been said that 'site provides context' (Rosenberg, 2010). The camera regulates the site of a dance film, the dance happens inside of the frame. Although the linearity of the film both space and time wise can be played with in postproduction, the spatial context in which the dance film happens is inside of the frame.

### **3.1.1 Video**

The use of video in this case is to join video technology and live performance from the performer's point of view, to enhance the performer, for the performers sake. This project uses improvisation as a language tool to facilitate a dialogue between technology and live performance. I have looked at live dances in theatres where the video is doing quite the opposite: stopping the dancers from moving effectively, diminishing their size, adding a layer that does not draw from the performers movement but from a 'stage setting'<sup>26</sup> place in the theatre performance.

I am not saying that this approach is wrong, but that it was crucial for the project that that was not the case.

I wanted to create a live performance film that would not start before movement happened (it started with the drawings) and that depended directly on the performer's reaction to each drawing as it was created. The true interactivity of this piece relies on the relationships established between all the elements. Video is one the elements.

It is fundamental for this piece and for this research the need of creating a structure that allows the dancer to perform freely. There is a wish to achieve a situation where there would be no physical constrains for the performer or for the filmmaker. I was determined not to have to compromise. Understanding the possible problems arising from making a dance film, and having tested some of those before the start of this research, the aims of "LFPP" are to combine the strengths of live performance and

---

<sup>26</sup> Carol Brown piece "Nerve" is a good example of a video projection well integrated into a dance performance as stage setting/providing context for the piece.

the strengths of film, allowing them to cohabit in a structure that permits them to co-exist and develop without compromising.

Referring to an article by Jan Verwoert who is an Art Historian and Critic. titled "TV Eye on You: On the Video-Works of Hilary Lloyd", 2001

Jan Verwoert lives in Berlin and is a contributing editor of frieze. He writes, among others, for Afterall and Metropolis M.

The text starts with the author painting a picture of London as being a place that always scared him. He states he feels the city as an inhuman city even though the scale of the architecture is quite human like and the skyline is not that high. He seems to compare the lack of individuality and possibility for a human being to make a mark in the city as a good one for intensifying the anonymous feeling you can get in a large city. He then talks about waling down the street and trying to decode the huge amounts of displays of identity people seem to have to the point of information overload. Which one can read as a contradiction to the point made early on the text about the lack of individuality in people. Anyhow that is what the author is saying. He states that there is too much reading to do in every individual code , meaning gestures, facial expressions of fashion statements against the anonymous background of the city stage. One can choose between closing the blinds in order to leave the urban theatre or on the contrary get a part in the play straight away.

This takes us to Hilary Lloyd's latest installation showing Monika, Darren and Darren, Sotiris and City Film (2000) that seems to resonate with this idea of urban performance. The main idea about this installation being that it seems like an endless establishing shoot for a film that never actually starts therefore setting the stage for an action that never occurs. No human figures, performers or any movement appears. The author goes on referring to the city as a silent witness without feelings or emotions by the events unfolding or the everlasting performance the citizens offer on a daily basis. The camera just looks without reacting.

At some point in the installation bodies appear to perform mundane tasks, giving shape to a vast unoccupied space - and all three performances on the tv monitors

seem to evolve directly from a sense of vacancy by giving it shape. It's the impulse to do something, to perform, to not stand still, to kill time as the author puts it.

The author then carries on stating it's not the actual gestures or performance on the videos but actually the context in which they are set that creates their own space and time. The performances are so casual they might seem like a warm up exercise if they are shown in a gym or a setting alike. Also because the monitors in the installation are set in a round configuration they kind of creates a place. The installation is therefore referred to as self-referential in the sense that it is about the specific spatio-temporal experience being created where it exists.

One of the films on the installation "City Film" has a point of view from the top of a tower in Central London revolving and mirroring the point of view of the viewer. Inside the installation, which has monitors placed in a circle facing inwards, the viewer achieves an empty gaze almost operating as a significant blank. The author carries on by saying that the viewer can be said to fill the vacant space and time induced by the empty gaze of the camera. Therefore, the whole installation can be interpreted as a play which continuously empties and fills space and time<sup>27</sup>.

This sense of the camera being a still spectator can also be found in "Untitled 1" by Sonia Rodrigues. LFPF thrives on this idea that the camera is pointing not at the performers but to an adjacent space where drawings are being created and then projected onto the performers. The drawings start the performance, and when the performer reacts physically to them, he moves. The fact the drawing is a projection of light and not a physical mark allows the performer to discover the interactions between all this non-physical happenings around him. The projection allows for the performer to catch that same light with the drawings in different points in space and to explore the three dimensionalities of the space. The establishment of a language between the performer that makes the drawing and the performer interacting with them is one of the most successful ones in the piece.

---

<sup>27</sup>

<http://www.afterall.org/journal/issue.3/tv.eye.you.video.works.hilary.lloyd><http://www.afterall.org/journal/issue.3/tv.eye.you.video.works.hilary.lloyd>, Jan Verwoert, Edited Online at: *Afterall Journal* Spring/Summer edition 2001, consulted in December 2010.



One of the difficulties of working with cameras and dancers is the inevitability of the camera becoming an intruder in relation to the dancer's space. It is a reality that most dancers have more experience in performing on stage and much less experience of performing in front of cameras and the intrusive nature of a camera influences the dance and the dancer's presence. Because of this and in spite of this fact, on the live film performance "Untitled 1" the focus was shifted off the camera. Instead of pointing it to the performer, it was pointing at the adjacent space (the white paper on the table) where the drawings were created.

By then projecting that onto the performer, the result was a filtering or a diversion of the attention from the performer's body onto its spatial context by interacting and tampering with it.

This sense of a spectator camera and non intrusive one can also be found in pieces like "Stations", 1994 and "The Messenger" 1996 by Bill Viola, where bodies submerged in water hang limp, suspended in space in a five-channel installation. The images are projected onto vertical slabs placed on the floor perpendicular to the granite ones.



Figure 2 "The Messenger" by Bill Viola

It was said right at the beginning of the thesis that the swiftness with which the last century shaped an electronically linked planet is reflected in the rapid expansion of art practices - the marriage between art and technology which gave birth to 'the most ephemeral art of all: the art of time'

There is a sentence from Verwoert which states that Dawn revels in the beauty of vacancy. And I leave the thought of the importance of this concept in this information-overloaded world we live in<sup>28</sup>.

With LFPP that sense of vacancy rests at the whiteness of the paper covering the floor of the performance and the gesture of the drawings occupying and filling the performance space, and the sense that no movement starts without the prompt from the drawings.

### **3.1.2 Improvisation language in Dance**

Improvisation has the possibility to offer dancers a range of opportunities to explore the richness and diversity encapsulated within the form of improvisation. It is created under firm guiding principles: established beginning and end points, structural boundaries, predetermined limitations, and unqualified acceptance of whatever is the aim. Laura Pawel's uses a choreographic that takes deciding where in each work she is willing to have control and give her performers freedom to improvise. "As a choreographer, if I see the same movement over and over, I get bored," she says. "I want the performers to retain the structural elements that I set out but to surprise me with the details."<sup>29</sup>

---

<sup>28</sup>

<http://www.afterall.org/journal/issue.3/tv.eye.you.video.works.hilary.lloyd><http://www.afterall.org/journal/issue.3/tv.eye.you.video.works.hilary.lloyd>, Jan Verwoert, Edited Online at: Afterall Journal Spring/Summer edition 2001, consulted in December 2010.

<sup>29</sup> <http://www.backstage.com/advice-for-actors/dancers/improvising-dance> consulted January 2012

In the performance “Untitled 1” it was of utmost importance that although a structure was set and the language was worked on, the dancers had the freedom to react to the drawings and their dancing environment in a non constrictive way. About dancing principles this are some of Jonathan Burrows statements: “Principles: A principle is a way to make a map where no map exists. The landscape is there already, but a map might help you decide where to go.

Entering the landscape without a map is also fine, so long that’s what you want to do.

Principles:

This is not the best way to work it’s just a way to work.”<sup>30</sup>

These statements were used to begin this chapter because they truly catch the essence of what the task was to achieve for instance in “Untitled 1”. A way of working with improvised Dance with a principle behind that allowed choice for the dancers to respond towards or away for the stimulus given by the drawing.

According to Jonathan Burrows, improvisation is only one of lots of other possibilities to work. (Burrows, J, 2010) In the case of “Untitled1” it was the most adequate and most free way to collect movement and also give a chance to a dialogue to develop between dancers and the space they were emerged into. Also the fact the drawing were on the floor had this quality of mapping the space, of tracing ways to follow or to drop. Burrows talks about the freedom being there to set the form but also as a way not to be responsible to make a choice as well as the freedom to go away from a choice because there is something to deviate from.

“Improvisation is a negotiation with the patterns your body is thinking”<sup>31</sup>

“Improvisation, in my way of handling, demands a constant connection with something – object, action and/ or mood in a situation. (...) One must take a chance

---

<sup>30</sup> Burrows, J. (2010). *A Choreographer’s handbook*. Oxon: Routledge.

<sup>31</sup> Burrows, J. (2010). *A Choreographer’s handbook*. Oxon: Routledge.

on the fitness of one's own instincts. (...) In the improvisation, at the moment of moving into an action; one must behave and feel as though no other choice exists..."<sup>32</sup>

But for instance, for choreographer Forsythe, *"he is interested in a deconstructive reconsideration of the possibilities of ballet,"* says Helen Pickett, who teaches university courses and professional workshops based on William Forsythe's approach to improvisation as it can be seen on the website further pointed out.

*"Forsythe's improvisation technique is broken down into what he calls "modalities," which are about 30 movement concepts, such as shearing, collapsing, folding, and matching. Once you improvise ways of moving your body in the different modalities, they become "reminder tools," giving you a whole new set of ideas to use to trigger movement variation or invention.*

*Before students explore the modalities, Pickett feels it's important for them to be introduced to Forsythe's idea of the "dissected" body. "When I teach," she says, "I give a series of warm-up exercises that involve breaking down the body—taking your head away from your shoulder, your shoulder away from your ribs—so when you walk, you don't take your torso forward in space as a whole, but you may take your chin before your hip. You also learn to use more sides of your body. You may be asked to move forward with your scapula rather than your chest, or to step backward with the left side of your knee."*<sup>33</sup>

So we have looked at different ways to take different paths in improvisation, which informed how "Untitled 1" was structured in terms of movement, space and interaction with the drawings and sound. The dancers also brought into the choreography parts of the story of their days so they could construct and create movement and interpret the abstract expressionist drawings and environment with stories of their day to day live. As mentioned on the sound chapter we also recorded their daily experiences to create a sound wave for one of the samples used on the piece. In this way, it's all connected and intertwined.

---

<sup>32</sup> Yvonne Rainer, Kaltenbunner, T (1998). Contact Improvisation, with an introduction to new dance. Germany. Meyer & Meyer Publishing. P39.

<sup>33</sup> <http://www.backstage.com/advice-for-actors/dancers/improvising-dance/> consultes January 2012

### 3.1.3 Interaction/Dialogue/Collaboration

When thinking about Interaction and Dialogue in Dance pieces, one of the first possible issues that can come to mind are collaborative processes. For instance for Marie-Claude Poulin and Martin Kusch “the human, dancing body is itself a technological tool”<sup>34</sup> and in their work the use of responsive environment or an intelligent state that allows for interactivity can be found. The control over lights, music or film is given to the dancer by placing special sensors and pads whose location is tracked by cameras and therefore provides triggers in a computer that has control over the stage. In their work one can find the “inner, micro-movements of the body’s nervous system are played out onto the projected space around it”<sup>35</sup>. There are close connections with the thought process behind the piece by Sonia Rodrigues “Untitled 1” which will be talked about further in this text and uses the system introduced in this thesis, LFPPF; the element which coordinates all parts is the drawing instead of the computer, giving the painter the control over the piece instead of the dancers, leaving them free to respond to the drawings and interact with the environment without having the responsibility of operating the system and sound as well. Back to Poulin and Koush, the piece “Scheme II” is an intertwine of reality and virtual spaces where the dancer performs with a video of itself, giving the dancer an almost alter ego or a ghost like image to interact with. Poulin stated that “at first you feel like you have no body because you begin to focus on something outside of it. You have to learn to forget about your virtual self, and embody it somewhere in the back of your mind”<sup>36</sup>.

This was of utmost importance when working with the performers in both “Untitled 1” as well as “Bella and the Belly”. The sense the dancer had to abandon the virtual self and at the same time work with it and integrate it into the performance. In “Untitled 1” the dancers interacted with the drawings and painting becoming one with the space they inhabited. The process of work during rehearsal always allowed the dancer to decide whether to take the prompt for movement given by the drawing,

---

<sup>34</sup> <http://londondance.com/articles> consulted in August 2013

<sup>35</sup> <http://londondance.com/articles> consulted in August 2013

<sup>36</sup> <http://londondance.com/articles> consulted in August 2013

or take the decision to not follow it. The decision-making process was very much part of creating a language that allowed for a dialogue and interaction between dancer and spatial context. The drawings were projected on the floor therefore creating a submersive environment for the performance to unfold.

With the piece “Bella and the Belly” the pregnant dancer improvised the dance in an outside space, and then the film was projected back into her belly. The sound in this installation was then performed by the public on the speakers of a laptop, using a Max MSP application that created a feedback sound depending on how far or how close the hands were from the speakers of the laptop. On the other hand, the application reacted to the light of the film being projected using a video camera recording the film, and translated it into horizontal lines with the colors of the film and moving lines depending on the amount of light the film had at any point. On both cases the idea was to create a language that connected different elements and were dialogue and interaction between performer and video that functioned as one and not two different elements, not separated. In both cases the sound was activated by an element of the video leaving the performer free to be truly submersed on the dialogue created between performance and video.

Merce Cunningham’s collaborative process is one of no collaboration at all as he puts all the elements together only on the dress rehearsal, therefore dance music and video are only put together at the end. For instance the motion captured video for “Fluid Canvas” Cunningham used also his method of putting elements together by chance. He uses methods as simple as tossing a coin to determine in which order the elements or parts of the choreography are going to be presented (Kostelanetz, Charlip, 1992)

What elements were surprises and successes using the piece “Untitled1” as an example:

Getting all the elements to coordinate themselves without allowing one to become more important or evident than the previous one, was a success and a difficulty.

It was extremely rewarding to work with the performers in such a way that the final piece was not choreographed. A lot of time was spent working on the establishment of a language between the dancing performers and the painter performer (the ones performing inside of the film, and the one drawing).

A lot of time was spent making sure that language would allow for the use of the elements like the white screen on the floor because of an improvised action rather than a pre-choreographed one. It was important to load the performers with knowledge of the possibilities within the setting, and how the elements reacted to certain inputs. Also, what consequences would arise from certain choices? For example: paper that has been creased will not go back to its original smoothness – although it may seem obvious at first, the important issue was to explore how to behave when the paper was creased. In addition, the line between what was real and virtual was of maximum importance. The paper on the floor (screen) might be smoothly placed on the floor, but the projection might be showing folded or creased paper on the table. The performer in the whole performance was in a sandwich of two worlds, one real and one virtual (light).

**How the work was developed with the performers in “Untitled 1” in order to achieve an interactive dialogue and collaborative language:**

According to the Dictionary the definition of Language<sup>37</sup> is:

1. a system of communication with its own set of conventions or special words
2. a nonverbal form of communication used by birds and animals
3. the use of signs, gestures, or inarticulate sounds to communicate something
4. the characteristic forms of expression used by those in a specified group or sphere of activity

Rehearsals

The first task was to establish a language and a character. To create one, invent it. A character that has not experienced anything before. Like a new born person. Everything is new. The types of reactions are of discovery all the time. The first task

---

<sup>37</sup> Encarta® World English Dictionary © 1999 Microsoft Corporation. All rights reserved. Developed for Microsoft by Bloomsbury Publishing Plc.

was to deconstruct the character in order to obtain a persona in a state of non-childish innocence.

Attraction/repulsiveness: Do they like green? Does green create any type of emotional response in them? They will find out during the time set for the performance. Anything this character learns, about the world they will live in, they will learn, discover, apprehend, and react in 15 minutes. The starting point is one of knowing nothing, and therefore the performance duration is a discovery for the performers.

On the first rehearsals, we worked on the language of our relationship.

The performers inhabited the film space and Rodrigues was drawing. There was a need to find a language that was non-hierarchical because there was no intention from the painter to have more power than the performers.

A work process was used where a new element was introduced in every rehearsal with the intent of keeping it a genuine discovery for the performers and not a fake/acquired one.

In every single rehearsal, up and including the day of the performance a new element was brought into the performance. When I say element I am referring to a new color, a new object to be placed onto the film. Objects used in between the drawings included drawings and paintings to flicker in front of the camera, letters that had been written during the process of making the piece, and of course all sorts of different types of paints like ecoline and large felt pens and pencils. They were placed on the paper, therefore projected onto the screen on top of the performers, creating a reaction.

It was important for the movement to be improvised for all the performers. Because the language that was being established was based on chain reactions, and also because of it being a live film it was essential to keep the liveness of it that not only it was not pre-recorded but also not pre-rehearsed. "Untitled1" was proposing to be a genuine improvised dialogue between all the elements that constitute it.

Of all the different elements that were a part of the final performance, on the first rehearsal the work was done with paper only. Several possibilities of movement were



explored so that that the result was a getting the performers to be used to the paper on stage. At this point there was no knowledge of this, but in the end of the performance all the paper ended up being removed from the stage by the performers which added a layer of interesting connection with the material when it becomes just strips of white paper again. In order for the paper to be related to as a white screen, it was laid on the floor in several layers, of 1 meter wide strips, so the performer was always inside the screen. There was a need to create an awareness of being inside or outside the screen, like in film a body is in shot or out (in the screen or outside).

On the second set of rehearsals, the work was with paper and video projector. The paper was laid flat on the floor, in layers just like in the first rehearsal, and experimented on simple drawing inputs like lines and geometrical figures in the space with the intent of exploring relationships and language between performer and drawings. Questions that were being asked: How do the drawings have an effect on the performers movement? How can the performers be prompted to be attracted or follow a line that is being drawn on the space? How can the performer be at ease with the drawing and not have scared reactions?

Mapping the space/relationship of scale: what happens if the hand of the painter comes into the film? Scale - big hand next to small body. This is a film issue, the one of overlaying different scales of bodies. If a line is drawn in the middle of the screen, will the performer feel the space has been split in two, and how will he respond to that partition of the space. The work was done with simple geometrical patterns on the screen. The markers used to draw were simply thick permanent markers in primary colors to obtain an immediacy of response when laying a gesture on the paper.

Already on this set of rehearsals the sound was starting to arise. The next chapter is about sound and in there will be information on how it was part of the creation process and also part of the movement. The task was to recollect and say out loud everything the performer had done since the moment they woke up to that very moment in the rehearsal. I leave this subject to be more analyzed on the Sound chapter.

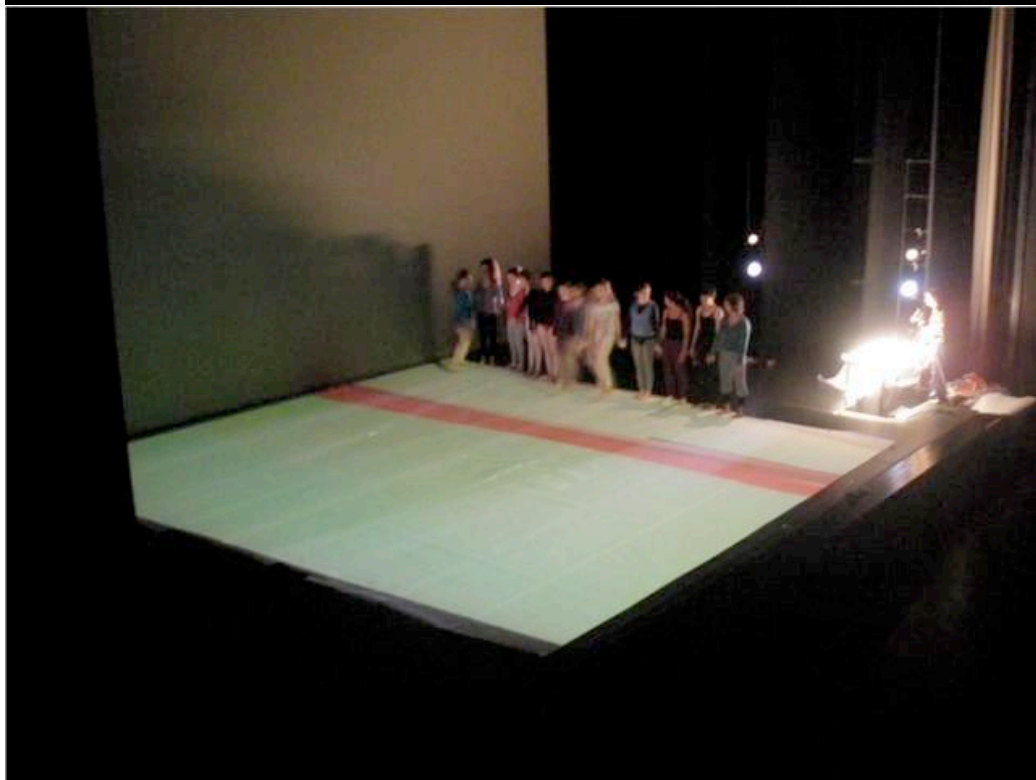


Figure 3 Rehearsals of “Untitled 1” by Sonia Rodrigues.

Third set of rehearsals: The drawings got bigger in size, fuller occupying more space and leaving less white space left. It was also introduced runny ink as a material and brushes, which allowed for fast coloring of the surface as well as fine detailed lines. The prompting of directions started really showing, with the drawings making the performer move in a specific direction, follow a path, or following a succession of circles by jumping from one to the other as they were being drawn. This instant relationship between the performer and its environment really started to shape up, and it could be very seen clearly how the changes on the space would prompt movement on the performer. At this point, a new rule was introduced: the rule of the performer always having two choices. Example: To react/not to react, to pursue/to move in the opposite direction.

After having worked with this rule for a while, the realization was there was a management to establish a fluid process of chain reactions. Because the performer always had a choice, there were barely any hesitations on making choices. In the same way, the same rule was established for the painter as well, of always also having two choices all the time. Example: If the performer reacts towards the drawing the painter chooses to carry on with that line of drawing or drop it immediately, If the performer reacts away from the drawing, the painter either carries on with that drawing even though he is engaging away from it or the painter decides to follow him up in the space.

The decision of always having two choices became a rule of freedom. Within a rule, the language was being created towards chain reactions, which felt related very much to film where frames succeed each other's fluidly over a period of time. The way a film is though out is movement through frames and places.

Fourth set of rehearsals: At this stage, one had established a connection between the two types of performers. Up to this stage there had been a relationship evolving between performers and drawings/ between performer and environment / between performer and white screen

The performers also asked for drawings and for directions. The film was becoming alive and live. The performers on the film were asking for the action, and were getting it, and then again sometimes not. The '2 option rule' was working really well at this stage. The 'I either react in this way or I don't' predisposition in both parts gave a lot of freedom within an incredibly fixed structure. It allowed for a true dialogue, conversations where sometimes people talk at the same time to then say "what?" and restart talking again.

One had discovered and established a language that was successful and exciting for the piece.

All the tools were found in order to create a language and a dialog was going on. At this point, it was clear one had managed to create a truly interactive and responsive dialogue between performance and its special context, between performers and its surroundings between performers and painter. It was important from the beginning that this live film was not going to be a stable static environment but a truly responsive one.

The text "Some of Theory of Interactive Media Art and Experimental Interactions" is very informative and relevant to this interactivity issue on this research. It is part of the Lectures in Helsinki University of Art and Design 6-7.11. 2000 by Ylitalo, J 2000<sup>38</sup>

#### About the Art of Interrelationships – Action – Reaction

The author starts by enquiring about what interactive art is. And talking about it as the art of interrelations, that by doing something there is a direct response to your action that means it's a reaction to your action.

Which immediately makes one think about participation, about audience involvement in a piece.

The author then carries on stating that the art of interrelation does not necessarily need a computer since we engage ourselves every day in art of interrelationships with

---

<sup>38</sup> <http://www.magic.ubc.ca/~adulic/kenneth/va371/readings/Intersections%20media-actionplace.pdf> consulted in November 2012

Ylitalo, J 2000, 'Theory of Interactive Media Art and Experimental Interactions', Lectures in Helsinki University of Art and Design, Helsinki.

each other and with the physical world. The computer seems to be very well suited for creating interrelations since we can re-design them. He claims that with a computer we can design action reaction relationships that never existed before. In this research frame one always thought of any model of interaction or interrelation as a human model based on the way we interact as human beings.

In the book *Emotional Intelligence*, Daniel Goleman talks about how people's emotions are more often than not expressed through other cues than words. He states that just as the mode of the rational mind is words, the mode of the emotions is nonverbal. (Goleman, D 1996)

The author of "About the art of interrelationships – Action – Reaction" states that Sensing-processing-response is the basic simple anatomy of interrelationship that can be created with a computer. Being that Input is what the computer senses from human interaction depending on the sensing devise. The processing is taken care of by software and algorithms. The output is the response generated. The author calls this triad structure the "human-sign interface"

Going back to the idea of interrelation and participation, audience as performer. The author talks about the possibility to incorporate the performance of the participant as part of the work as being a new element. Interactive computer technology can be very flexible with endless possibilities of combinations between genres and art forms. Interactive computer technology provides a genuine novelty: the action of the spectator, viewer, audience can actually be a part of the work. This shifts the audience member from a spectator to a participant or a performer.

And this is something I would like to focus on during this research:

Quasha when talking about Gary Hill's work talks about release. He talks about several senses of release. "Gary Hill releases his work earlier and earlier. This means that he lets it go as soon as he can trust that the essential process, the intentional impulse, has been reliably generated. This first sense of release, which is focused largely at the technical and material level, gives over to a second: that the intention is released, let go into the work, which is entrusted with the power to realize it. This second sense is connected to a third: the empowerment of the author (therefore the participant) to just let go, to be released inside the work and its intrinsic spaciousness. There is an implication of self-trust, a confidence in balancing, a willingness to ride it out, let come what will. And this third deepens into a fourth:

releasement...letting go beyond habit and expectation, the (re)orientation toward possibility, life on the verge..."<sup>39</sup>.

"Tall Ships" will now be introduced as an interactive video installation by Gary Hill created in 1992, which illustrates several of the ideas presented above. It is one of the Artist's relatively early uses of video projection as installation. It is very clear to demonstrate issues of audience participation. It is also one of the very first pieces I had the chance to encounter and see live, and it left a mark. I will show later the account by Barbara Leon of her visit to this installation.

#### A Brief Description of TALL SHIPS / 1992

*16-channel video installation (NTSC, black-and-white, silent) with 16 modified monitors, 16 projection lenses, computer-controlled laserdisc players and switching runner mats for interactive triggering.\**

Down a completely dark, ninety-foot long corridor-like space, sixteen black-and-white images of people, varying in ethnic origin, age and gender, are projected directly onto the walls. No border of light defines the frame of the images: only the figures themselves give off light into space. The last projection is on the back wall, at the end of the corridor. From standing or seated positions ranging from one to two feet high, the figures are first seen in the distance at approximately eye level. As the viewer walks through the space, electronic switches are triggered, and the figures walk forward until they are approximately life-size. They remain in the foreground, wavering slightly, until the viewer leaves the immediate area. Since all the projections are independently interactive, any number of figures can be in the distance, walking toward or away from a viewer, or standing in the foreground, depending on the number of viewers in the space.

Figure 4 "Tall Ships" – Gary Hill's Projective Installations 1.

---

<sup>39</sup> Quasha, G; Stein, C 1997: "Tall Ships" – Gary Hill's Projective Installations – number 2.

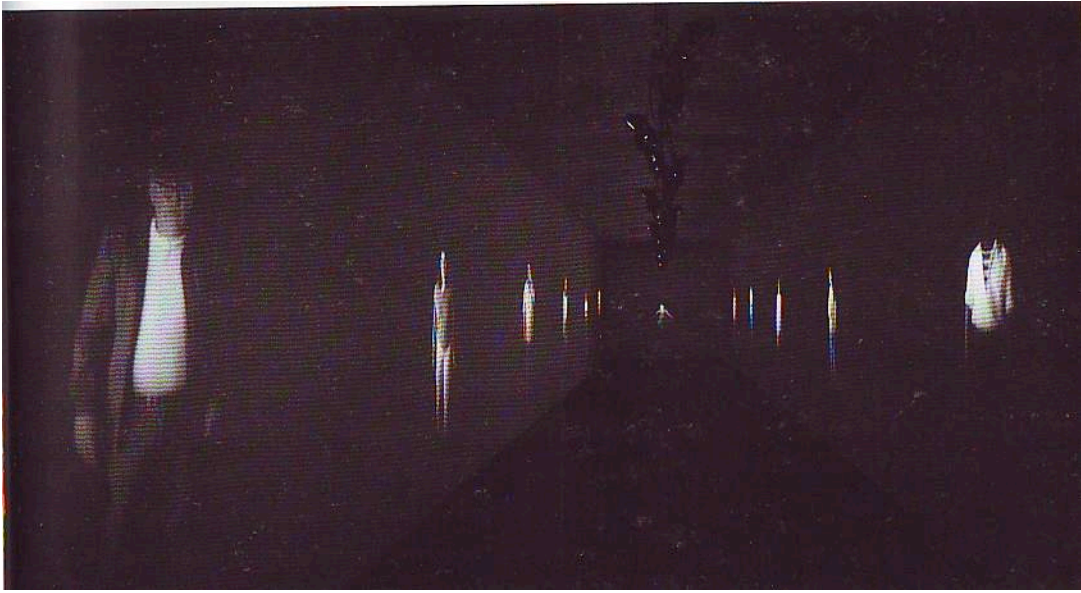


Figure 5 “Tall Ships” – Gary Hill’s Projective Installations 2.

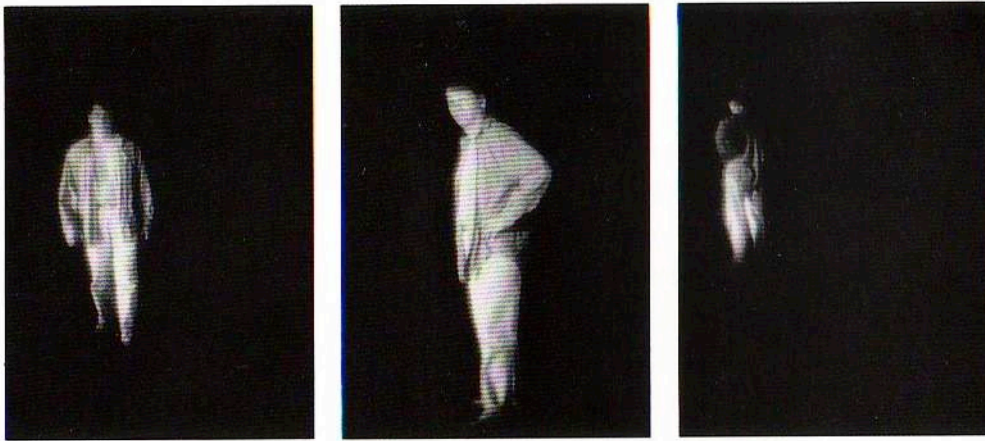
This is how Barbara Leon talks about the installation, and it feels right for the purpose of this research. The feelings it evokes are quite hard to explain but yet there is something incredibly poetic in the installation that has no words... only interaction between humans and mirrored humans (video projections of humans).



And here is a rather poignant account by Barbara Leon of her visit to the Whitney installation<sup>2</sup>:

Viewing the first two people I couldn't shake the feeling that the piece was completely interactive, that they were actually responding to me! I felt that *void* that comes up when you interact with someone new, that vertigo of unrequested spontaneity. I had the apprehension that another person would know me before I could know that person. Even though the characters weren't actually waiting for your input, you felt they were responding to your actual presence, as though they were sizing you up. It took a *physical effort* to not back up when they moved toward me, and I went into my *posturing mode*. It was a relief to know that other people couldn't see me make a fool of myself. One woman's image giggled and I felt myself giggling back. Then I noticed how my prejudices kept coming up. I decided that this





could be something like a great Buddhist piece that showed you yourself, and left you with awareness of your own perceptions and patterns with no way out. Amazingly, even when I went back for a second viewing I felt the *same reactions* coming up, even though I'd just been through this earlier! Like when a “father figure” appeared I went into those automatic father-reactions. There I was posturing with an illusion! The power here of being face to face with a person is just so great that there's no escape from seeing your own feelings. It made me sad to see my own preconceptions about people—to see what we do when we meet people—it's so automatic. You can't control those things but you can *recognize the way the mind manifests*. Painful as it was, this was a safe context to see yourself in, to witness the operations of your own mind. People come and stare at you and you make up all this garbage about them. I had to admit there were people I just wrote

off because they're not the kind of people I normally want to spend time with. I found that I became most engaged with those who were the most different from me—like the black man. When I wasn't immediately open to someone there, I had to acknowledge it was *my* limitation not theirs. When I left the installation I found that it had altered my response to art in general—that I was open to works that otherwise wouldn't have moved me.

Figure 6 “Tall Ships” – Gary Hill's Projective Installations 3.

The author claims that interactive work can be also narrative, that navigable is almost always a narrative structure. He goes on saying that it is difficult to explore a space without attributing narrativity to it. In the case of “Tall Ships” it is easy to agree, as the installation seems to function as a mirror for unconscious responses. And so, as a conclusion, here is a question about the viewer responding to the object viewed. In the case of Tall Ships it seems to work as a mirror, mirroring our minds as spectators.

“I am the mirror in which I am the image”<sup>40</sup>.

### 3.1.4 Sound

#### Diegetic Sound and Nondiegetic Sound

In film terms and by definition, Diegetic Sound is sound which has its source in the story world and Nondiegetic sound is sound coming from a source outside the story world. Music added to enhance a film’s action is the most common type of nondiegetic sound, and particularly in dance films it is believed to be one of the most accepted. The reason why it can be accepted has to do with viewing conventions.

An example of that situation, which has been mentioned before:

“When Roger Thornhill is climbing Mount Rushmore in North by Northwest and tense music comes up, we do not expect to see an orchestra perched on the side of the mountain”<sup>41</sup>.

To a certain degree, one does not think whether a sound is Diegetic or Nondiegetic anymore because it’s understandable and accepted the conventions of film viewing.

Nondiegetic sounds are by excellence collected from external sources to allocate specific characteristics to the dancing body. (Ex: In the dance film “Motion Control” by Liz Agiss, when the body is moving inside a hole in the wall, the sound of the body’s friction with the wall is one of glass/ceramic)<sup>42</sup>. We do not believe the body is made of glass, but we accept that poetic layer as a metaphor for something else.

Spatial contexts can also be changed (ex: a body dancing within the frame, and the sound of the sea can be heard.) Time is also another interesting factor, it is possible to create the illusion of movement speed: the same dance sequence with different

---

<sup>40</sup> Quasha, G; Stein, C 1997: “Tall Ships” – “Gary Hill’s Projective Installations – number 2”.

<sup>41</sup> Davis Bordwell and Kristin Thompson, Film Art: An Introduction (New York, London: McGraw Hill, 2001) 330.

<sup>42</sup> <http://www.lizagiss.com> 15 October 2013.

types of sounds can seem to be performed in different places, slower or faster depending on the music or sound characteristics.

Having said that, Sound can be a parallel illustration of what is happening on screen, or it can offer a total different dimension to the subject.

The beauty of it is the range of emotions that sound can offer and the widening of range of perception of the image on screen.

In the case of “Untitled1” a combination between Diegetic and Nondiegetic sound provides the right balance. The combination between the sounds of the body moving in space (floor, breathing, clothing, body friction) and different sounds created in postproduction provides the dance film with variety and a miscellaneous of reality with imaginary/fabricated worlds that are very interesting for the context of this work and reflection.

As it will be explained more in depth further into the thesis, the sound for “Untitled1” was mediated by a computer application developed by Andre Baltazar, called "Colorasom" which uses visual computational algorithms that allow real time analysis of what is being drawn. Depending on the colors used and their disposition on the screen, the program executes different sounds (pre-determined samples) allowing therefore to the Artist to control the visual and sound aspect of the piece through the drawings. The application colorasom had different samples of sound to shot. Two different tango Pieces and two samples created with the voices of the dancers throughout the making of the piece. Since the theme of the piece was to do with the performers daily lives and experiences then it made perfect sense to include some voice work in the process of making the piece. Some of the choreographic work was also drawn from those texts, so it all connected in some way.

“...hold a watch a distance from the ear, and then move it toward the ear till you can just hear it; then keep it in this position for two or three minutes, and observe that you hear it only intermittently. To check this, raise your finger when you hear the sound and lower your finger when you do not hear it.... You will then find the hearing and silence periods alternate with fair regularity, the periods varying from 2 to 8 or 10 seconds in the extreme. This periodicity is primarily one of attention and reaches

out into all of our mental processes, being one of nature's contrivances in the interest of the conservation of nervous energy"<sup>43</sup>.

### **3.1.5 Drawing**

It's important to mention that the style of drawing used within the piece was abstract expressionist drawing, and gesture drawing. It is important to address that drawing is one of the oldest ways of expression and that the method of artists such as Jackson Pollock influenced the way I related to the paper surface on which I was drawing. Drawing as a gestured mark, as a spatial enquiry, as making a note or a draft of a movement, as a happening and therefore as a prompt for the performer to move. There was reflection around how gesture is important in this work, as well as what are the relationships established between body gesture and painting mark. Also the question arose during rehearsals how is the gestural mark evoking an emotional state?

At the Baltic Movement Conference, New Media/New Dance in Gdansk, Poland where the piece "Untitled 1" was shown on video, there was quite a lot of interesting discussion about painting being a noble art and the mixture with Dance which is not considered one. There was quite a clear cut between Fine Artists and Dance Artists about the question of the dancers being free to respond to the drawings or being manipulated but them. If we look at Abstract expressionist Painting and drawing, for instance at Jackson Pollock's (Harrison, 1974) work there is quite a similarity in terms of what's being discussed here. Pollock by adopting the drip and-spatter technique and dried-out brushes and sticks was enabled by these means to maintain a distance away from the floor and the canvas. As with LFPP the video camera offers that distance to the painter through the video projection. Pollock was a painter with a lot of rhythm with large sweeping movements of the hand applying the paint to the canvas. There is a straight link with the type of marks being used in a piece like "Untitled 1" using LFPP particularly in terms of intention. Gesture becomes very

---

<sup>43</sup> Seashore, C E. (1967) New York. Psychology of Music.

important to the expression of the painting and drawing and also to the way the dancers receive the marks on the floor and react to them.

#### EDITORIAL

Steve Garner

Lecturer,

Department of Design Innovation, Open

University.

“It has been twenty eight years since Bruce Archer identified a tripartite structure in education where a third competence, equivalent in value to numeracy and literacy, was highlighted. In his paper *The Three R's* (1976) he appealed for a recognition of skills and knowledge founded on 'sensitivity, invention, validation and implementation'. Archer was keen to promote the broad competence of 'modelling', by which he was referring to cognitive as well as practical capabilities, but he recognized that drawing was fundamental to this. He recognized that drawing not only enabled individuals to externalize the results of creative thought but also that developing confidence and competence with drawing extended the very capacities which provided the material for communication.

The legacy of Archer's work can still be seen today. The papers appearing in this issue of *Tracey* can be viewed as evidence of two conflicting paradigms in drawing research. Some suggest that current drawing research reflects Archer's virtuous circle - that research through drawing informs research into drawing and vice versa. Others suggest that drawing researchers are aligning themselves into one or other of two camps - those researching through drawing occupying an inner space and looking out, while those researching into drawing occupy an outer space are but looking inward. The former paradigm is characterized by research activities which straddle the interface between research into and research through drawing. The latter paradigm is characterized by drawing research which interprets the interface as a boundary, situating itself on one side or the other. It doesn't seem to be a practice-based issue. Drawing practitioners would appear to occupy both camps. The work presented in this collection of papers suggests an attitude dividing line rather

than one marked by particularities of drawing practice, use of media, or application of research strategy.

A second issue concerns drawing practice and digital media. While drawing is perhaps one of humanity's oldest means of expression, never before have we had such a variety of media with which to make drawings. One manifestation of this variety is the increasing power and affordability of computer-based communication systems for making, saving and transmitting drawn images. Much of the developed world now takes for granted the sophisticated technology which enables us to construct, manipulate and communicate drawings via computers and which would appear to rival traditional media such as pencil and paper in its convenience and capacity.

For James Faure Walker the use of digital technology for drawing practice is liberating and his paper articulates the personal, iterative processes which feed on, and give rise to, paper-based media, three dimensional constructions, photography and digital drawing. He discusses the creative tensions in his own practice between having an objective in mind whilst at the same time actively seeking opportunities for change or development.

Gabriela Goldschmidt is widely published in the field of design and so brings to the debate practices and requirements very different to those operating in other areas of the Arts. Like Faure Walker, she views drawing as a key element in a process of inquiry, of focusing-in, and her paper uses the phrase 'treasure hunting' in the title. Central to Goldschmidt's paper is the notion of 'drafting and refining'. She notes important human capacities for being able to offer loose conjecture as part of a journey towards a loosely defined goal or treasure. However, she highlights concerns about the way digital media can impose limitations. She suggests that computer-based drawing can require the maker to approach the creative task with a greater level of predetermined ideas about both the subject and the process.

Both Faure Walker and Goldschmidt touch upon the notion of 'reading' drawings and the active scanning and matching processes which take place in the mind of creative individuals. Drawing makes a unique contribution to those transformational

processes which exploit human cognitive capabilities by providing external, constructed models in forms appropriate to analysis and rebuilding. The capacity for drawing to support the emergence of ideas has received much attention in the journals. It is not just the potential speed of drawing which assists cognitive processing. The very lack of clarity inherent in some drawing styles may be an important catalyst in creative transformation.

The notion of ambiguity reappears in Golan Levin's paper. His Alphabet Synthesis Machine deliberately provokes a questioning of our sense-making strategies, particularly the establishment of alphabets as the building blocks for order and communication. The algorithms used in the generation of new 'letterforms', which are arranged in fantastical 'alphabets', receive initial input from individual visitors to the internet-located machine and it produces some startling and beautiful drawings.

Alistair Edwards' paper, simply titled 'Gestures', provides an insight to a human capacity even older than drawing. Clearly in some contexts drawing is gesture and the similarities between gesture and drawing are very relevant to this edition of Tracey. Edwards presents gesture as a phenomenon displaying some qualities of a language, but one which ultimately demands interpretation. Sign language for example, clearly displays a vocabulary and a syntax but meaning is dependent on contextual factors which need to be determined by the viewer.

In a discussion of grammar and syntax John Willats focuses on marks as building blocks in drawings and paintings. This paper is built on a considerable body of earlier work by himself and other researchers. He makes the case that a picture syntax is already well established and is developed from the components of drawing systems and denotation systems. Willats proposes that a third component - a mark system - is less well developed and he uses parallels with linguistics to illustrate the type of knowledge about marks and mark-making we need to develop if we are to generate a more comprehensive understanding of graphical syntax.

The influence of digital drawing media on remote collaborative working has long interested me and in some comparative studies a few years back I found that

remotely located design collaborators worked-up their existing sketches to a far greater extent than did designers working face-to-face. They demonstrated a preference to work into (and sometimes over) existing drawings rather than start new ones - perhaps because existing drawings contained a level of shared understanding difficult to achieve in new ones. Those working proximally, using pen and paper, produced far more of a type of drawing comprising of three or less graphic acts - the fast 'thumbnail sketches' we might associate with progression in design ideas. Also, it seemed that drawings produced in the remote condition were used to support communication in a far more explicit way than was the case in the proximal condition (Garner 2001).

The drawing research community is relatively small when compared with other fields but it is a broad and catholic one. While the range of specific research activities is increasing - for example, drawing in digital environments and drawing which embraces the virtual and the physical, there are huge areas yet to be explored. Many of these new areas emerge from new interfaces opening up for drawing in the Arts, Humanities and Sciences. Personally, I see huge opportunities for research into shared and collaborative drawing and drawing in person-to-person virtual interaction, for example, in education, health or the service industries. Tracey will undoubtedly pick up some of these emerging areas of drawing research in future issues and I encourage readers to submit papers which bring their work to the attention of the drawing research community.”<sup>44</sup>

It is very interesting to think about Drawing and Notation. Drawing as a sometimes intuitive activity other times driven by convention means of mapping movement onto a surface, with special reference to innovative methods of notation. Drawing as an activity of recording and discovery. Drawing as a speculative activity and means of holding and transferring information. All of these thoughts came about while creating “Untitled 1” piece.

---

<sup>44</sup> Archer L B (1976) 'The Three R's', A revised version of a lecture delivered at the Manchester Regional Centre for Science and Technology, 7.5.76. Published by the National association for Design Education (NADE) UK.



About the exhibition “Drawing and the Body” which was an exploration of the body through drawing by creative practitioners from London College of Fashion the author Professor Frances Corner OBE states:

*“What is so pertinent about the subject of the exhibition. Drawing and the Body is the fact that, for both fashion and fine art, the body is central to their histories and to their current preoccupations. For each discipline, members of staff, students and graduates have explored what it means to be clothed, naked or nude, how the body is given presence through clothing and how the body interacts and occupies space. Having the opportunity to share these preoccupations with another institution is central to the development of artistic and design practices. This new ambitious exhibition, which takes place at KG 52 Gallery, Stockholm, will extend the debate about the body and its place in the development of fashion, showing how drawing is central in these debates. This exhibition presents an exceptional range of work by sixteen fashion designers and illustrators, costume designers and artists from London College of Fashion. It includes work by young up and coming practitioners as well as established, high profile figures as Professor Helen Storey MBE (Fellow of the RSA ), Professor Lucy Orta (artist, environmentalist and Member of the European Cultural Parliament) and Charlotte Hodes (winner of Jerwood Drawing Prize 2006).*

*Drawing and the Body is the third within a series of exhibitions developed by London College of Fashion, University of the Arts London. It has been preceded by the shows When Photography and Drawing Meet Fashion, at The Hong Kong Polytechnic University (2009), and Drawing Towards Fashion, at Fashion Space Gallery of London College of Fashion (2007). These exhibitions highlighted the*

Garner S (2001) 'Comparing graphic actions between remote and proximal design teams', in Design Studies, Vol 22 (4), pp365-376, ISSN 0142-694X.

*crucial role that, for students, researchers and practitioners, drawing plays within creative thinking and the fashion design process. They also disclosed an insight into the ongoing dialogue about drawing that is currently taking place at London College of Fashion. The intention of Drawing and the Body is to explore the relationship between drawing and the body, which indeed constitutes a primary*

*concern within fashion design. From the material and individual body, designers and practitioners in fact reinvent and redefine the concept, shape and even movement of the body. All the participants in the exhibition contribute to create a dialogue, bringing in their own particular perspective as well as being representative of the wide range of approaches towards drawing that is evident at London College of Fashion”<sup>45</sup>.*

This links very closely to Viktor and Rolf fashion catwalk performance<sup>46</sup> where the models are on stage wearing a blue collection, where everything is blue just so that onto side screen the blue could be exchanged by video images. At times the model opens the jacket and the inside is blue and therefore on the screens what can be seen is the image of leopards moving inside the jacket. It’s a quite striking way of using video in a wearable way. This obviously can be transferred onto stage very easily and it’s aesthetically very beautiful. I find it to be the same kind of thought behind the “Untitled one” performance where the dancers react to the drawing on stage.

## **3.2 The Performances**

These 3 performances that follow are experimental work created to test ideas on this research.

The creation of three experimental pieces titled “Untitled performance” in May 2010, “Bela and the Belly” in August 2011 “Howling arm” also in August 2011 were also part of the methodology used to test some of the ideas proposed in this research.

### **3.2.1 “Untitled 1” performance, May 2010**

The first performance was done in May 2010, presented at Casa das Artes de Famalicão and I will refer to it as "Untitled 1". It consisted of a dance choreography

---

<sup>45</sup> <http://www.drawingandthebody.com/intro.php> consulted in August 2013.

<sup>46</sup> <http://www.youtube.com/watch?v=5hpz684cve8> consulted in September 2013.

exploring creative interactions between film, sound and live performance. Fifteen dancers were responding to drawings and the drawings to the dancers. This dialogue was created by projecting live drawings on top of the dancers, on a white floor, therefore the dancers inhabiting the interactive space of the stage. The sound was responding to the colors of the drawing, I worked with an application from a colleague. I will talk more about it further down, on the chapter about the Live Film Performance Facilitator (LFPPF) which the research tool I have developed to test this ideas.

"Untitled 1" May 2010: A Choreographic piece using/testing LFPPF

In May 2010, at the "Casa das Artes de Famalicão" I presented the first public performance integrated on this Phd. It consisted of a Multimedia Dance choreography with live drawing projected onto the floor on top of 15 dancers. The dancers interacted with the drawings in an improvised structured dialogue and build their performative language from the stimulus offered by the drawings. This dialogue happens within a pre- determined structure contained by the drawing and the white paper on the floor (the film screen). Therefore the dancers moved through an interactive responsive environment mediated by the Artist creating the drawings; the sound was mediated by a computer application developed by Andre Baltazar, called "Colorasom" which uses visual computational algorithms that allow real time analysis of what is being drawn. Depending on the colors used and their disposition on the screen, the program executes different sounds (pre determined samples) allowing therefore to the Artist to control the visual and sound aspect of the piece through the drawings. The application colorasom had different samples of sound to shot. Two different tango Pieces and two samples created with the voices of the dancers throughout the making of the piece. Since the theme of the piece was to do with the performers daily lives and experiences then it made perfect sense to include some voice work in the process of making the piece. Some of the choreographic work was also drawn from those texts, so it all connected in some way. A lot of time was spent making sure that language would allow for the use of elements like drawings and the physicality of paper, because of an improvised action rather than a pre choreographed one. It was important to load the performers with knowledge of the possibilities within the setting, and how the elements reacted to certain inputs. Also what consequences would arise from certain choices? For

example: paper that has been creased will not go back to its original smoothness – although it may seem obvious at first, the important issue was to explore how to behave when the paper was creased. In addition, the line between what was real and virtual was of maximum importance. The paper (screen) might be smoothly placed on the floor, but the projection might be showing folded or creased paper on the table. The performer in the whole performance was in a sandwich of two worlds, one real and one virtual (light).

Andre Baltazar's text about the application "colorasom"

"On the original screen we have the captured image. That image is decomposed in a matrix that contains the RGB color of each pixel. By choosing any pixel with the mouse the RGB characteristics are then stored and used to find all the other similar pixels to the original. On the "Colorasom" application that method was followed . Three different RGB parameters were established for 3 different colours. Each colour has an associated sound (sample). When the colour comes up on the detected image, the application checks it and the correspondent sound is activated.

When the colour is removed the sound is deactivated.

The application is subject to glitches and technical failure, since it's based on the color detection, the RGB parameters have to be very well calibrated and any slight variation of light on the captured image creates failures on the detection.

In this case, since it's an interactive performance and not a case of life and death, the glitches are permitted, or not!! " (Text by Andre Baltazar, creator of "Colorasom")

The glitches offer an uncertainty aspect as if the application has its own personality. I will not within the context of this paper enter on a discussion about technological failure as being considered creative, but I do leave the note of it being something that needs to be addressed and thought of throughout this research in a future stage.

To see online an excerpt

<https://vimeo.com/129342363>

### **PhD Piece 1 SHORT**

This is "PhD Piece 1 SHORT" by Sonia Rodrigues on Vimeo, the home for high quality videos and the people who love them.

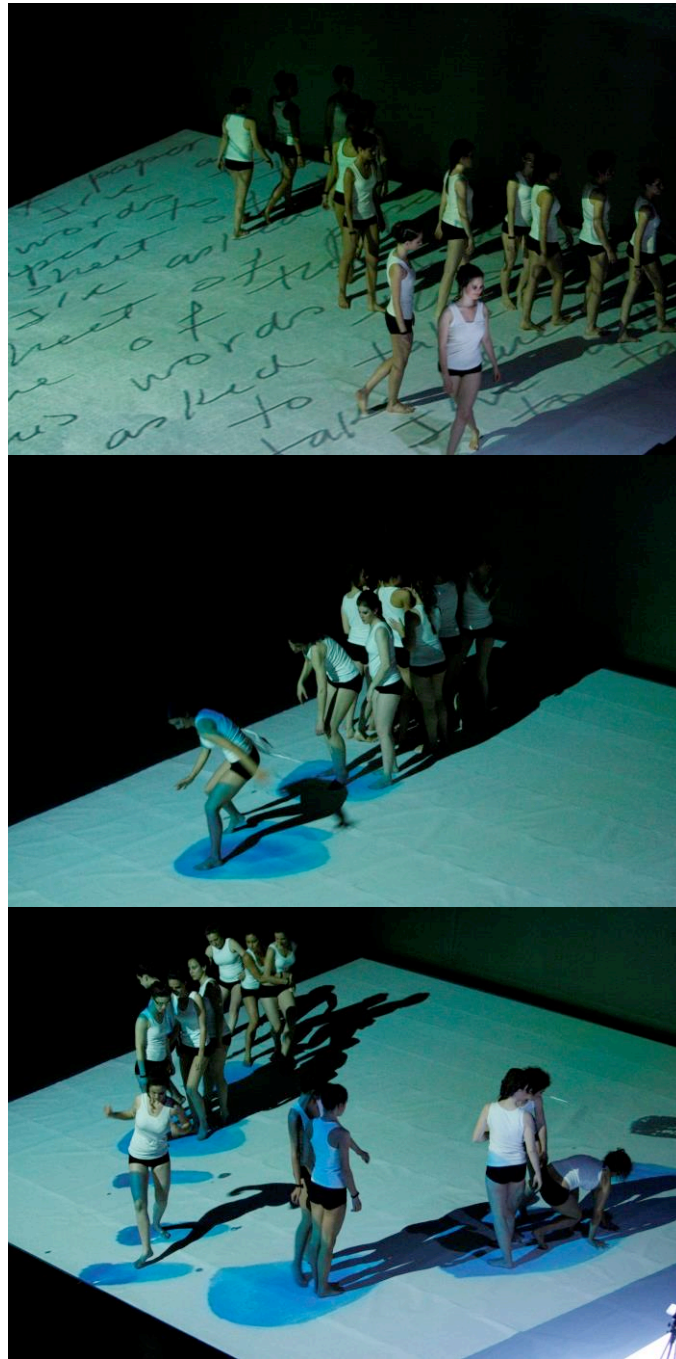


Figure 7 “Untitled1” by Sonia Rodrigues with LFPF 1.

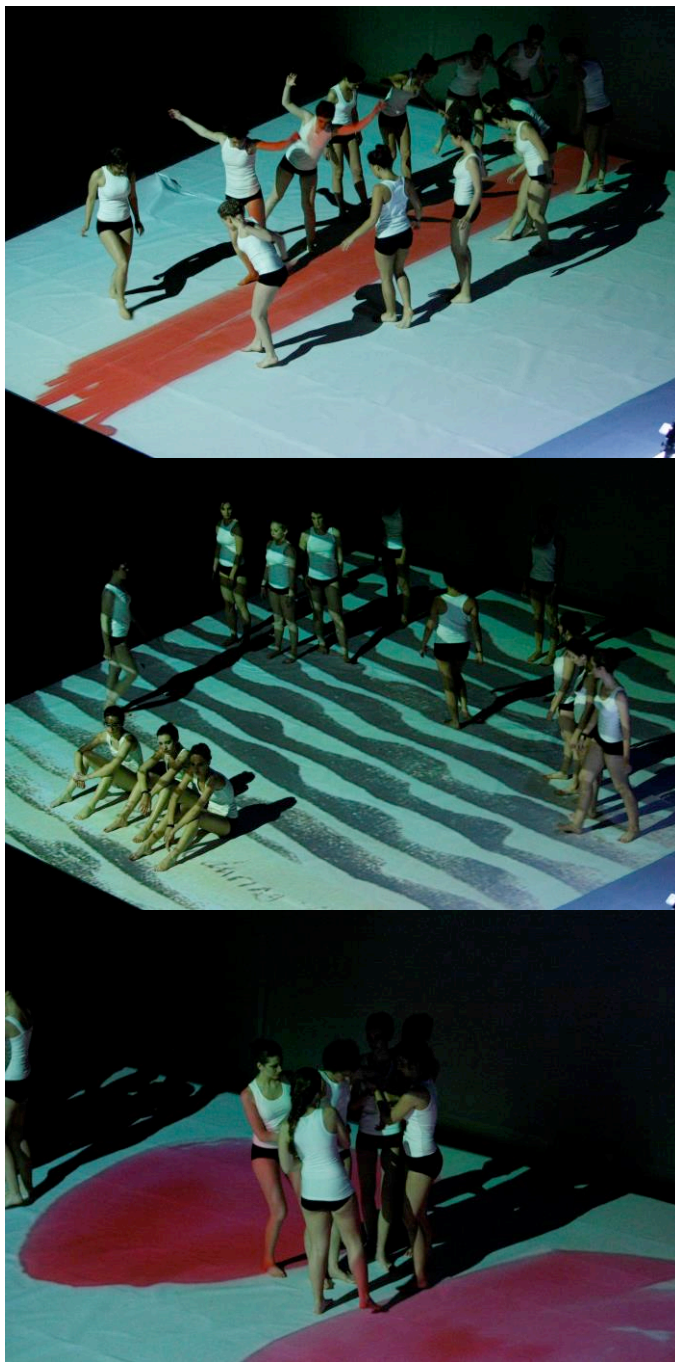


Figure 8 “Untitled1” by Sonia Rodrigues with LFPF 2.

### **3.2.2 “Bela and the Belly”, August 2011**

Created as part of a 4 month research stay at the DapLab (Digital Arts and Performance Laboratory), Research Centre at Brunel University, London, UK.

This is a video with Hanna and Bela. Hanna is beautifully pregnant with Bela. This project had a very interesting starting point as the dancer had severe moving constrictions because of being severely pregnant, and had very little idea of how she could participate on any project unless it was a gentle one and not physically demanding. Immediately the idea for this research, the non intrusive technology for dancers seemed very adequate and the dancer got increasingly more excited with the idea of being involved.

The project entailed recording pregnant Hanna dancing slowly in the outside in the grass and create a video out of that footage. The second stage was to project the video of her moving into her own pregnant belly skin. A final film of this was created, with Hanna moving on her own belly. This film was then shown as one of the elements of an interactive installation. Figure 28 is the diagram of the installation. This Installation was performed in August 2011 at the Interaktionslabor 2011 in the former coalmine of Göttelborn in Germany.

To see online an excerpt

<https://vimeo.com/129342362>

#### **Bella and Belly 1 SHORT**

This is "Bella and Belly 1 SHORT" by Sonia Rodrigues on Vimeo, the home for high quality videos and the people who love them.

[vimeo.com](https://vimeo.com)

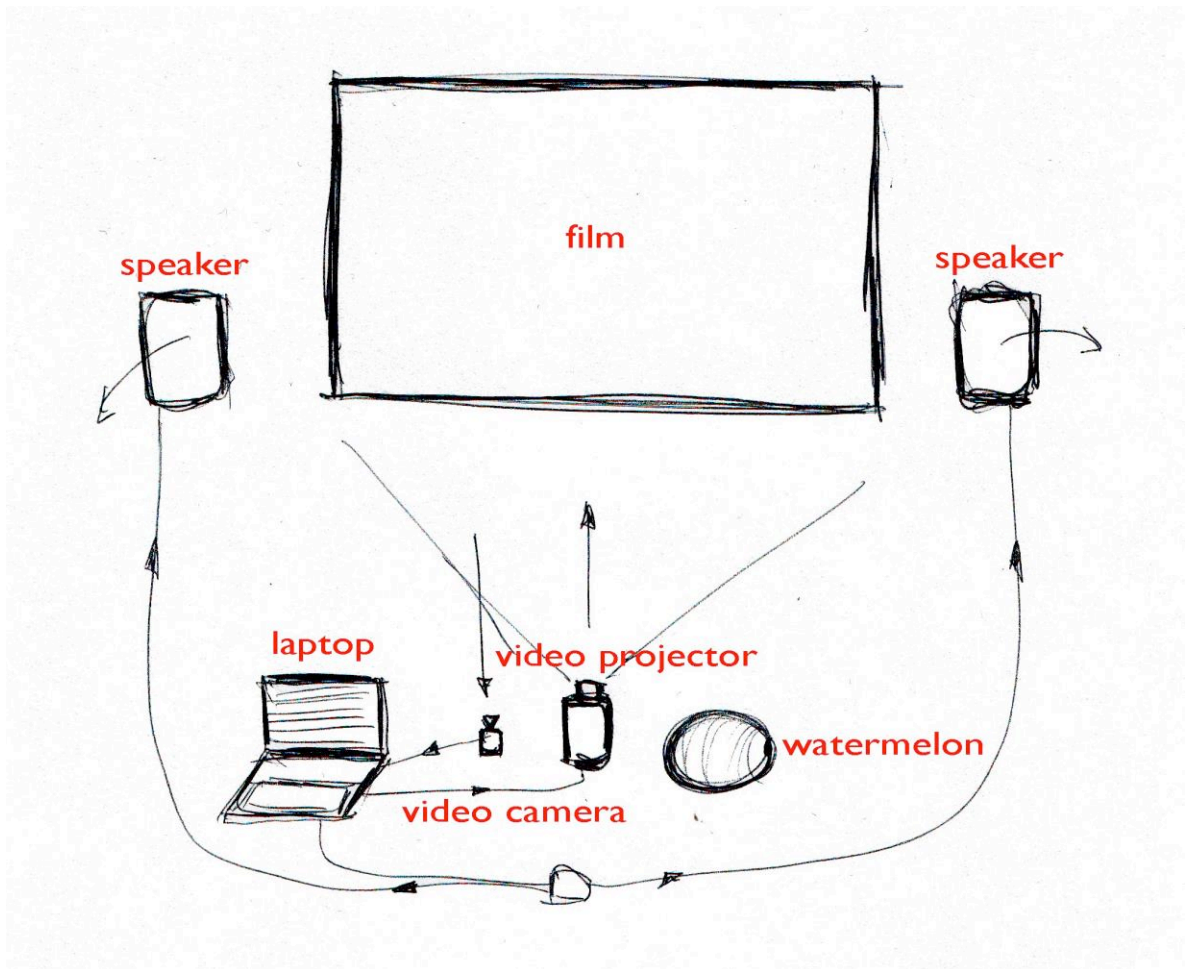


Figure 9 Bella and the Belly Installation by Sonia Rodrigues

Sound: feedback loop played in the laptop speakers by the audience using a MAX MSP application called “speakers & mirrors” by John Richards

Video: representation in lines of the light in the film using the application “speakers & mirrors” done in Max MSP by John Richards

The watermelon was a gift from some of the participants in the laboratory, as it was so similar to the film of Hanna moving in her own belly. It became part of the installation and on the last day we all shared the watermelon as a celebration of the end of the lab.



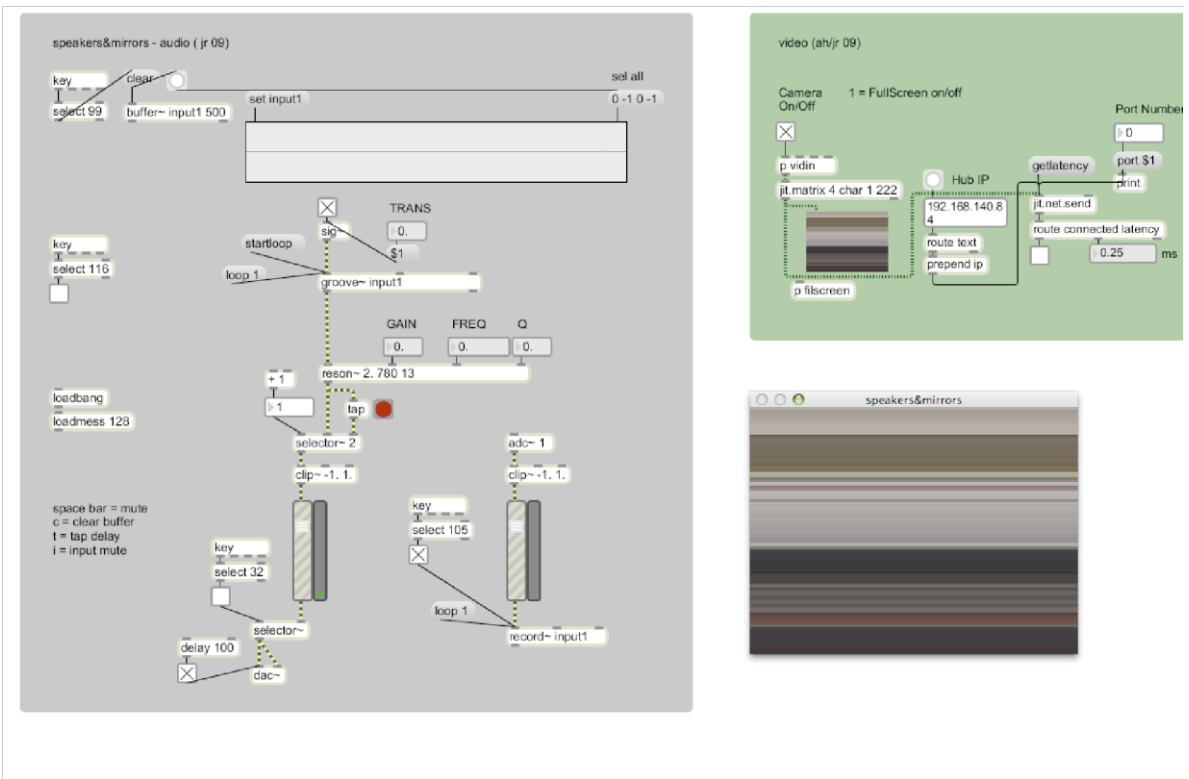


Figure 10 “speakers & mirrors” application by by John Richards in “Bella and the Belly” installation by Sonia Rodrigues



Figure 11 “Bella and the Belly” video with Hanna Ma by Sonia Rodrigues. Part of the Interaktionslabor 2011 in the former Coalmine of Gottelborn, Germany.



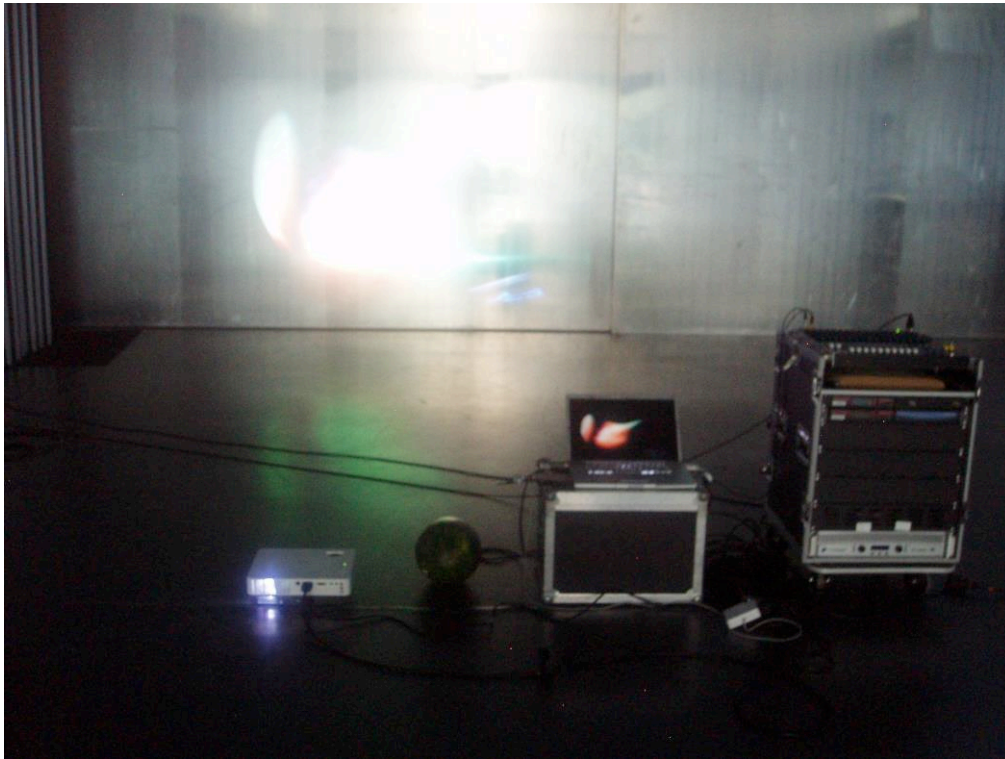


Figure 12 “Bella and the Belly” video with Hanna Ma by Sonia Rodrigues. Part of the Interaktionslabor 2011 in the former Coalmine of Gottelborn, Germany

Part of a 4 month internship at the DapLab (Digital Arts and Performance Laboratory). Research Centre at Brunel University, London, UK.

The workshop Experimental Lab ran for 10 days in mid-August, and the focus that year was on gestures: gestures and movement between generative practices, sound bodies, social agents, wearable/mobile technologies and social interactional scenarios and techniques that point to an expanded context of creative arts practices and social choreographies.

### **3.2.3 “The Howling Arm”, August 2011**

Interaktionslabor 2011 in the former Coalmine of Gottelborn, Germany Part of a 4 month internship at the DapLab (Digital Arts and Performance Laboratory).  
Research Centre at Brunel University, London, UK.

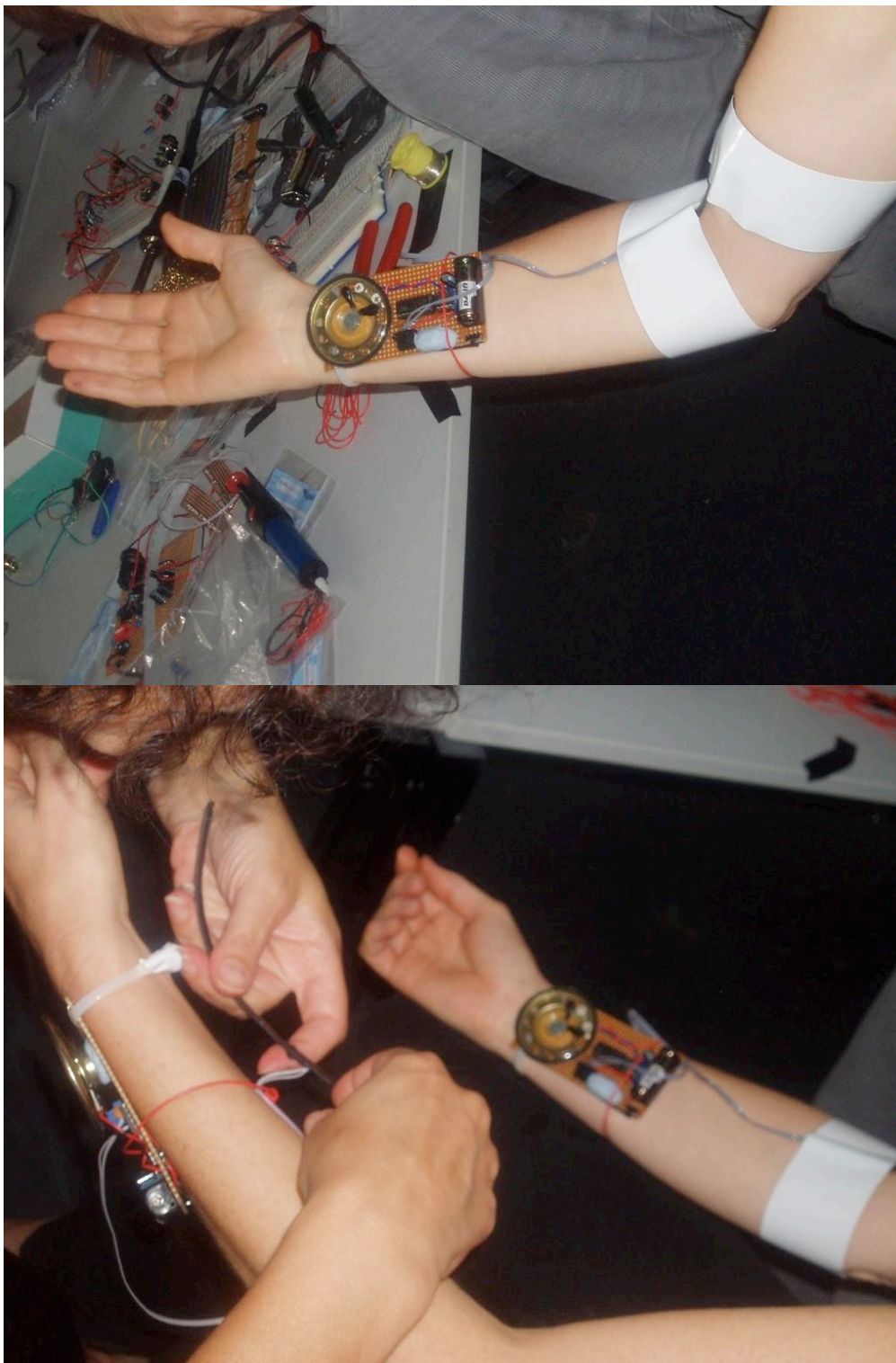


Figure 13 The making of the wearable analogue sound piece by Michelle Danjoux (wearable technology designer) in collaboration with John Richards (Sound Artist) with exploration by Sosana Marcelino (Dancer).

The concept for this analogue wearable sound piece was generated by Michelle Danjoux (wearable technology designer) in collaboration with John Richards (Sound Artist) with exploration by Sosana Marcelino (Dancer).

Sonia Rodrigues (video) came into the project thinking about creating a self contained film where the sound was created solely by the performance itself, instrument and voice. The video was created with 3 different layers of the image each with a second delay from the previous one, giving the idea of a three dimensional video, adding to the idea proposed to the sound being all created within the piece and therefore the piece being all created within the existing recordings. No addition of external shots was made both video and sound were created and worked from the original footage of the rehearsal. The transformation from the original performance was quite clear in the video.

Sandy Finlayson (Sound Artist) created the final soundtrack. He wrote the following text about his experience.

“Sonia Rodrigues presented me with a short video piece she had been working on based around footage taken within Interaktionslabor. This included an audio track featuring the slowed and layered sound from the original performance. Since the original piece was exploring wearable sound, and using this in live performance, I decided to simply process the audio that was already there, and create a bit more sonic variation whilst keeping the audio true to the video. I did this in Logic Pro 8, using only native effects.

The audio processing took the form of four parts; a filter, a phase distortion effect, a reverb effect and a sub bass enhancement. I decided to start the piece with almost total silence, using the filter to gradually bring in the frequency spectrum from highest to lowest. The phase distortion plugin was then used liberally, creating quite a harsh sound to really exaggerate the otherwise slightly muffled source material. An example is at 1'32" where you can hear the phase distortion coming back into effect after being briefly removed for the moaning sound at approx 1'23". At around 1'52" the reverb starts to be heard, creating an artificial sense of space and depth. I did this primarily to add variety to what is a very narrow palette of sounds. The sub-bass enhancement occurs between 1'30" and 2'10". I find that, assuming you are playing the audio on a system with a sub-woofer, have some very low frequencies can really add a sense of scale to a piece. Since the vocal sounds were pitched quite low anyway it felt like a natural next step. I kept it only to a specific period in the middle of the

piece to enhance the overall dynamic contrast, and imply some kind of forward progression.

Essentially the different effects and processing were used to allow for interplay, contrast and evolution. By introducing them fairly exposed and then gradually combining them together it gave me many possibilities to vary the soundtrack whilst retaining the original source material generated when Rodrigues made the video.”<sup>47</sup>

To see an online excerpt

<https://vimeo.com/129342361>

### **Howling arm 1 SHORT**

This is "Howling arm 1 SHORT" by Sonia Rodrigues on Vimeo, the home for high quality videos and the people who love them.

[vimeo.com](https://vimeo.com)

---

<sup>47</sup> Text by Sandy Finlayson, sound artist on the project.







Figure 14 Video by Sonia Rodrigues “Howling Arm”. The making of the wearable analogue sound piece by Michelle Danjoux (wearable technology designer) in collaboration with John Richards (Sound Artist) with exploration by Sosana Marcelino (Dancer).

August 2011 Interaktionslabor 2011 in the former Coalmine of Gottelborn, Germany. 10 day residency. Michele Danjoux and John Richards created a wearable sound piece in collaboration, Sosana Marcelino wears it on her arms and explores movement and voice and text with it. Sonia Rodrigues created a short film and invited sound artist Sandy Finlayson to work with the sound and create a new soundtrack.

### **3.3 Conclusion**

One of the very first results arise from preoccupations and explorations with the 3 pieces created, “Untitled 1”, “Bella and the Belly” and “The Howling Arm”.

There has been a huge concern for the analysis and testing of human mediated technology and computer mediated technology. Freedom for dancers and non constrictive technology has been at the forefront of this research - no movement constriction, and no need for the dancers to manipulate the technology

Throughout this research collaborative structures in Video technology + Laptop (Max MSP), Dance, Drawing and Sound have been looked at and researched as possible creative solutions for the relationship between Dance and technology.

Also looked at and tested wearable portable analogue sound technology and at non computer mediated sound machines, by testing and collaborating and analyzing how other artists created small, intimate sound creation by looking at constriction boundaries of gadget in the body.

While Dance made for the camera and screen refers to work made in both film and video, prior to the middle 1960's most dance for the camera was rendered in film, (with the exception of dance rendered for television) as video was not yet available to the general public. Nevertheless in the mid 1960's, Sony introduced the first portable video equipment. What was available at the time for the recording of real-time activity was a revolution. Video technology allowed immediate feedback, it was relatively easy to use and required no lab time to develop. It was quite immediate to say the least and easy to use. At first portable video cameras might have been seen as an easy way to document dance, but then choreographers, dance and video artists started recognizing the potential for making dance for the camera. This is to say that making dances for the camera quickly became a viable alternative to theater-dance, but a strong force in how choreographers reconceived the art of dance for the theater, quite evident in the cinematic quality of the pieces of many contemporary dance-makers.

One of the main objectives in talking about this is to articulate with Meredith Monk's wish within the pieces Juice (1969) and Needle Brain Loyd (1970) to create a live movie having a fascination with cinematic space and time.

Film theorist Carrol points out that in the first decades of the cinema especially, filmmakers naturally gravitated toward imitating the other arts". Carroll points out

that from the beginning, dance and film had a natural point of tangency... both it might be said, were concerned with movement.

Video dance is a product of the current technological revolution.

Nevertheless, art works reflect the culture they were born from and video dance and the intersection of the two is no exception. Carrol states: *“No artwork can be created in a vacuum and dance for the camera is no different. As technology has advanced over the past one hundred years, the works reflect those advances. Amy Greenfield's Earth Trilogy (1971) and Carolyn Brown's Dune Dance (1978) are works that are immediately recognizable as products of the 1970's, reflecting the attitudes and concerns of the era. We can read both works by the signifiers evident in the structural language, film stock, and movement quality, even the duration of the pieces, all of which gives us clues to its era of creation. Maya Deren's A Study in Choreography for Camera (1945) with Talley Beatty finds the filmmaker breaking taboos, transgressing stereotypes and making a distinctly political statement by featuring an African-American not as a servant or a butler as Hollywood did at the time, but rather as a fully formed human being, an elegant and talented dancer. Deren uses the dancer as the constant in a shifting landscape of place and time, the flow of movement unbroken as location changes from scene to scene, questioning our relationship to the logic of chronology. At moments in Deren's silent film, Beatty seems suspended in mid-air for a humanly impossible length of time. At others, an unfolding of the dancer's arm begins in one location and seamlessly ends in another, the choreography literally "moving" the viewer into another place. As we move through radical eras of our history, dance for the camera has mirrored the upheaval in the culture and in fact served as a site for the discussion of issues of gender, race, disability and the very nature of dance itself, even while leaving us with a palimpsest of the concerns of the makers in their time”.*<sup>48</sup>

The Performance created with LFPPF titled “Untitled 1”, brought to light many of the challenges and needs dealt with when technology meets live performance. The performance titled ‘Untitled1’ was born out of Film concepts. It was indispensable to test and explore the language of film in a Dance Context (in the Theatre and within a

---

<sup>48</sup> <http://www.dvpg.net/docs/videospace.pdf> consulted February 2012

Dance Audience) and the true nature of interactivity between film, the stage environment, sound and the performers both dancers and painter.

The performance video piece titled “Bela and the Belly” was also born out of film concepts, it initiated with the fact the dancer was very pregnant and a video projection on the body could be a gentle way of introducing visuals into the body. So in this case, the pace was very gentle and caring because of the physical needs of the dancer. A first video was shot with the dancer dancing outside on the grass and then that layer was projected onto her belly and filmed again. That is what the final layer of the video looks like. Nevertheless, the sound of the piece was again created through the video, through the visuals. The application looks at the projected final version of the film and translates the amount of light and reflection on the video into a feedback sound.

The video titled “Howling Arm” is an experiment where the sound of the video was created within the piece and not with any external sounds incorporated. The sound from the performer’s voice, the sound from the analogue instruments on her arms that reacted to her movements and finally the manipulation of the final sound by a sound artist. Also the video was created with several layers of the same image with a second delay between them to convey a more three dimensional image to go with the 3 stages of sounds incorporated.

So to conclude there are Common denominators between ‘Untitled 1’ and ‘Bela and the Belly’: Human mediated technology and computer mediated technology, Freedom for dancers - no movement constriction and no need to manipulate the technology, Collaborative structures and Video technology + Laptop (Max MSP). The piece ‘Howling Arm’ has the characteristics of wearable portable analogue sound technology, of looking at non computer mediated sound machines. It is a small, intimate dance and sound creation

And it is looking at constriction boundaries of a small analogue gadget in the body.

The result being a film where the sound was all created within the piece itself and no external sounds were brought in.

## 4 Discussion and analysis of results

While all of the above pieces were happening, there was a four month stay (June to September 2011) at the DapLab (Design and Performance Laboratory) Research Centre at Brunel University, London, UK.) where many of these ideas came to shape, and where discussion was alive with other performance and technology practitioners. Also many other experiences that will be talked about in this chapter came to live and were incredibly important to shape this research.

The DapLab is the Design And Performance Laboratory part of the School of the Arts at Brunel University in London, UK.

“DAP-Lab is a cross-media lab exploring convergences between performance, telematics, textile/fashion design and movement, clothing and choreography, visual expression, film/photography, and interactive design.

Founded in 2004, the Lab is now housed at Brunel University and continues research partnerships with multiple sites in the USA, Japan, and Brasil which have formed the ADaPT network on performance telematics since 2000. DAP-Lab also connects ongoing research investigations and productions in dance (Digital Cultures) with performance/science collaborations (TransNet), and brings these partnerships into knowledge transfer with performance, multimedia and electronics engineering research at Brunel University's School of Arts and School of Engineering and Design”<sup>49</sup>.

“The Centre for Contemporary and Digital Performance provides an open interactive laboratory for exploratory research in the time-based arts of theatre, performance and performance media involving a large group of research practitioners in performance at Brunel University's School of Arts, as well as the research and performing arts organizations affiliated with the activities of these practitioners.

---

<sup>49</sup> <http://people.brunel.ac.uk/dap/arch.html> consulted in December 2011.

Research in performance is rapidly expanding in the contemporary global context of the arts, sciences, education, communication/information economies and creative industries. The polycentric emphases in the new research environment rest on a distinctive trans-disciplinary vision which increasingly fuses artistic performance, writing/composition, theory and performance ethnography with digital creativity, science, and engineering.

While drama and the production of actor-based theatre continue their strong cultural tradition, other modes of performance art, cultural performance behavior, movement and experimental theatre, camera-based performance, installation and new media/technologically augmented performances extend current practices and the scope of scholarship.

Open to partnerships in research collaboration with others in the School of Arts, the School of Engineering and Design, and institutions elsewhere in the UK and abroad, the new Centre's activities will foster both individual projects in performance, directing, and writing, as well as integrative design projects with real-time synthesis and digital technologies. Investigating opportunities for working at the frontiers of performance and technology, where new modes of representation and interaction are invented.

Some members of the Centre's research group and partners seek to explore and help define the future of theatre and performance in their intersections with digital cultures, and with new media technologies and communications in the creative industries. The activities of the technology studios at the Center are also balanced by a range of non-technological practices and research interests, including body centering, physical work; liveness; site-specificity; audience interaction; text; place; social inquiry and new audiences.

The wider research goal is to explore the limits of physical performance, and the boundaries between digital media and embodied performance behavior, both from an artistic and an engineering viewpoint. Combining live theatre with engineering, performance with scientific theory (in the various associations performance has made with research activity in cybernetics, AI, robotics, biology, the cognitive sciences, etc), the Centre will drive a series of projects over the next ten years and beyond which continue to build members' national and international relations with other research ventures into performance cultures.

The staff of the new center includes: Johannes Birringer, Susan Broadhurst, Steve Dixon [emeritus], Meretta Elliott, Daniel Ploeger, Mary Richards, Gretchen Schiller, Stelarc, Fiona Templeton, Joel Anderson, Alyson Campbell, and Broderick Chow. All Phd research students of the School of Arts, and particularly of Performance, are also associated with the Centre<sup>50</sup>.

#### **4.1 Baltic Movement, New Media/New Dance**

Sonia Rodrigues participated in this conference in Gdansk, Poland and showed the video for the piece “Untitled 1” and introduced LFPPF. Also she presented a historical overview of how the project came about and what other pieces gave birth to “Untitled 1”.

Baltic Movement Conference is a meeting of dance practitioners, theoreticians, managers of culture and people experienced in promoting and supporting dance. The goal of the conference is to stimulate a critical discussion about the new currents in the contemporary dance and exchange of ideas and practices in the field of dance research, education, production and promotion.

The main theme of this year’s Baltic Movement Conference is “new media, new dance”. Together with a group of dance and media researchers and artists who work on the verge of arts and genres, we will try to answer such questions as: did the new media and technology change the way we understand dance, movement and body? did they influence the methods of creating choreography and composing its dramaturgy? does dance, as an art form and a means of expression and communication, help us find our feet in the contemporary culture dominated by new media and cybernetic technologies?

This year’s conference’s guest researchers will be, among others - prof. Steve Dixon, Brunel University, Prof. Johannes Birringer, director, DAP-Lab, Brunel University,

---

<sup>50</sup> <http://people.brunel.ac.uk/dap/condip2.html> consulted in November 2011.



Susan Kozel, Ph.D, Medea Collaborative Media Initiative, Malmö University, Ulrike Josephine Fenger, Ph.D, Max-Planck-Institut für Wissenschaftsgeschichte, Berlin, Karolina Bieszczad-Roley, Ph.D. Artists such as Eila Goldhahn, Ramona Nagabczyńska, Maria Lloyd and Sonia Rodrigues will present their dance films. There was also the visit of an extraordinary guest - Ryan Woodward - who is an animation artists strongly influenced by dance.

There was some very interesting discussion amongst the panel about LFPF being the most poignant for this research the balance between drawing and dance. Most of the fine artists felt the balance was right, although there was some discussion amongst the dance people about the artist making the drawing in “Untitled1” playing the role of god or the puppeteer. There was an interesting talk about the process in which the performers engaged in order to end up with a language that allowed them to choose which direction to take and also they had the choice to always take the prompt for movement or not. An interesting issue that arose was the fact that drawing and painting are noble arts and dance is traditionally not.

This point was made by Professor Steve Dixon of Brunel University.

## **4.2 Digital Futures**

Digital Futures Conference in Dance happened in 2011 in Bournemouth, UK and Rodrigues attended. It was an opportunity for artists, promoters, producers, venues, academics and creative and digital companies to come together to discuss future possibilities for dance and technology. With an increasing growth in interdisciplinary practice, Digital Futures in Dance investigated how new digital technologies create new conditions for choreographing and presenting dance. The conference was structured around three interrelated themes explored through presentations, workshops, performances and installations.

Part of the seminars Rodrigues attended here are the most relevant to this research and the ones that most informed the practices discussed during the body of this thesis.

## Choreographic Thinking/ Physical Intelligence(?) with Scott deLahunta

Scott deLahunta presented examples of choreographic resources being developed by research groups working in collaboration with contemporary choreographers and speculated on how these efforts might help dance enter into a constitutive relationship with emerging conceptions of our intelligent thinking selves.

## New Technology and Choreographic Thinking 1 (Part 2)

### Motion in Place with Sally Jane Norman & Kirk Woolford

Human motion tracking need no longer be confined to normative lab or studio spaces, but is henceforth accommodated by systems deployed “in the field”. Motion capture platforms assembling distributed and hybrid resources are expanding the dance scene into new territories and prompting novel interdisciplinary encounters. The AHRC-funded Motion in Place Platform draws together dancers, media and sound artists and theorists, hard- and software designers, and archaeologists, to collaboratively develop technological prototypes and creative insights into the sitespecific spatial and temporal layerings of movement in place.

## New Technology and Choreographic Thinking 2 (Part 1)

### The Digital Reflection with Mark Coniglio Friday 9th September

The digital reflection – where sensory systems allow media to mirror the actions of a performer – has served as the dominant model for media intensive dance works for the past twenty years. A less common approach is the digital intervention – where a rigorous digital system so perturbs and impedes the process of creation, rehearsal and performance, that creators and performers alike are pushed in new and unforeseen directions. Troika Ranch co-founder Mark Coniglio offered a consideration of these two models, using the group’s recent work loopdiver to exhibit the powerful potential of the intervention as a path to new artistic invention.

## New Technology and Choreographic Thinking 2 (Part 2)

Whatever Dance Toolbox Talk with Nikolina Pristaš and Ivana Ivković (of BADco)  
Friday 9th September

Nikolina Pristaš and Ivana Ivković and introduce the work of artistic collective BADco, the development of the software Whatever Dance Toolbox and its impact on BADco's choreographic thinking and practice.

Intimacy, The Personal, Mobile Technology (Part 1)

The History Dances: Creating Portable, Mobile and Intimate Digital Work with Becky Edmunds & Fiona Wright Friday

The History Dances project was created by Fiona Wright and Becky Edmunds, two independent artists interested in generating small video works for use in live performance and also using live performance as a source of material for video edits to be placed as short films online. Using video, writing and choreography the work in History Dances looks to the idea of body memory – touching on our perceptions of time and history and stories.

WORKSHOP: Whatever Dance Toolbox

Nikolina Pristaš and Ivana Ivković (of BADco)

Launched in April 2011, 'Whatever Dance Toolbox' is a suite of free software tools designed to assist in generating, analyzing, developing and rehearsing choreographic work. Developed over the past 5 years by Croatian performing artists' collective BADco. and German human-machine interface developer and artist Daniel Turing, it consists of six applications which act as an 'active mirror' that displays qualities in real time which performers haven't produced yet. The tools employ different types of visual analysis, delay, reverse-play and slow motion functions, together with long exposition function, to allow dancers and choreographers to study, refine and enrich their movement choices and relationships. For: For professional dancers, dance students, choreographers, media artists / programmers with some experience in interactive media.

BADco. provided free LinuxLive CDs, which can be booted onto participants' computers<sup>51</sup>.

This workshop proved to be very interesting in joining performers to work collaboratively to achieve a result prompted by the software. The aim of this software is not artistic or aesthetic but very poignant in the process of collaborative choreography. The tasks from the software are video projected in front of the performers who have to follow what the software is demanding, giving a fun environment and a sense of achievement every time one set is completed. It definitely requires all elements participation in order to function, where the bodies try to match an image on the projection. Once the choreographic result is there even if prompted by the achievement of tasks from the software, on the final performance no video projection is seen.

### **4.3 Interactions Labor Saarbrueken, Germany**

In the summer of 2011, Sonia Rodrigues participated on the Interaktionslabor in the former coalmine Göttelborn.

The focus in 2011 is on gestures: gestures and movement between generative practices, sound bodies, social agents, wearable/mobile technologies and social interactional scenarios and techniques that point to an expanded context of creative arts practices and social choreographies. During this Interaction laboratory two pieces were created: "Bella and the Belly" and "The Howling Arm" both by Sonia Rodrigues

"During ten days in August, the international Interaktionslabor in Göttelborn collaborates with XMLab and Centre de Création Choréographique Luxembourgeois TROIS C-L, as well as Donlon Dance Company, on creating a new PERFORMANCE ACADEMY, a shared platform of workshop spaces and research facilities for performance-media design, interactional and wearable concepts, and investigations of gestural processes, protocols, and social choreography.

---

<sup>51</sup> <http://digitalfuturesindance.org.uk> consulted in January 2012.

With its partners XMLab, Centre de Création Choréographique Luxembourgeois TROIS C-L, and Donlon Dance Company, the Interaktionslabor shares the sense that the concept of research should be opened up (again), and aims to acknowledge the relevance of experimental treatments of actuality – of forms of collaborative creation – that may take us beyond the perspectives and protocols of (established academic) inquiry as we know it. Which is why we have chosen gesture as focus of the inaugural workshop – gesture as practice that is at once aesthetic, corporeal, and political. The lab will offer a series of parallel modules investigating the relations between choreography and software, sound and motion-design, movement capture and 3d digital/virtual environment navigation, light and projection architecture, dirty electronics and interactive programming.

The workshop in August inaugurated a 12-months series of performance and research events open to individual, collective, and institutional actors especially from the Greater Region (Luxembourg, France, Belgium) but also from the EU and beyond, to facilitate the sharing of approaches, experiences, and reflections. The events are varied, including workshops, hacklabs, and symposia, but will be organized under the common umbrella of the PERFORMANCE ACADEMY. The new academy plans to include exhibitions and concert/installations in an open platform for the exchange of new performance and media work; locations for these events include venues in Saarbrücken and on the coal mine campus in Göttelborn”<sup>52</sup>.

“Schedule of Research Modules

Saturday morning, August 13 Arrival

1. START UP of PROCESS IN GOETTELBOEN COALMINE

first weekend (Saturday and Sunday August 13-14)

Sunday August 14 CHOREOLAB [video/film and real time processes, with Johannes Birringer, Bernard Baumgarten, Gianfranco Celestino et al) Monday August 15

SONIC LAB [sound/light processes, short presentation by Marko Ciciliani]

Tuesday, August 16: 20:00 SONIC LAB / Electronics (Stefan Zintel and John Richards)

---

<sup>52</sup> <http://interaktionslabor.de/lab11/index.htm> consulted in November 2011.

c o n c e r t

Tuesday, August 16 20:00

All of Yesterday's Parties, electroacoustic solo compositions, sound-art works and light design by Marko Ciciliani at the Campus, Göttelborn Coal Mine

Wednesday, August 17: 20:00 SONIC LAB (with Stefan Zintel: PD environments for sound and image motion control)

GESTURE LAB / Electronics [gestural processes; critical literature on "Autonomy of Gesture - Interaction and Society"]

Thursday August 18 HACK LAB [electronics, with Soenke Zehle & Jan Tretschok] DESIGN LAB [wearable / mobile devices) with Michèle Danjoux and John Richards]

Friday August 19 CHOREOGRAPHIC / DESIGN LAB

Mag, mixed reality installation created by Marguerite Caruana Galizia, Anne Mareike Hess & Gianfranco Celestino (c) 2011

Saturday August 20 CHOREOGRAPHIC / DESIGN LAB

Saturday, August 20 20:00 Video / Choreographic Installations, Graue Galerie Campus 1, Göttelborn

(beyond, video installation, Anne-Laure Misme / Jennifer McColl / Sandy Finlayson (c) 2011)

Video Installation, Interaktionslabor Göttelborn in progress.

Hannah Ma and Sonia Rodrigues, Bela and the Belly, Video installation (c) 2011

Sunday, August 21 CHOREOGRAPHIC / DESIGN LAB

Sunday, August 21, 20:00 Choreographic Installations, Graue Galerie Campus 1, Göttelborn

Sosana Marcelino, dancing with newly designed costume and electronics, design by Michèle Danjoux and John Richards (c) 2011

Monday, August 22 CHOREOGRAPHIC / EDITING LAB sharing of work experiences amongst lab members

Marguerite Caruana Galizina and Sosana Marcelino in a new interactive performance (c) 2011

Tuesday August 23, debriefing”<sup>53</sup>.

#### **4.4 Interview on Dance and Technology Interaction for the Arts Academy**

Interviews conducted in the context of the Performance Academy, XMLab, 2011.

Inaugural workshop August 2011, Campus Goettelborn in Saarbrueken, Germany

Interview with Sonia Rodrigues, transcribed <sup>54</sup>.

“LAYERS”

Sonia:

Thinking about the multidisciplinary and the multimedia aspects of The Work, what comes into my mind are layers. Layers, multilayered performances and by layers i mean, I tend to work in Layers that go in several different directions: The Screen for instance might become three dimensional, something i forgot to mention earlier on, the Screen where the projections are being projected.

The potential for collaboration within that kind of system is, tremendous. In the sense that once the system is set up, once you got it running, you can invite musicians into the set, you can invite poets, you can ask the Poets to write on paper and then the poetry becomes an input also for the dancers.

You can have sound, or people singing and do the opposite with this (sound): instead of looking at the drawings you can look at the pitch of the sound and you can get something else shot, out of that.

So, the potential for collaboration within that structure, which is a really simple one, just two elements with a video camera is tremendous.

Thinking of other artists that work that way, in one of the last shows i have seen of Philippe Decoufle’ that technically speaking was very complex, but the way in which

---

<sup>53</sup> <http://interaktionslabor.de/lab11/index.htm> consulted in November 2011.

<sup>54</sup> <http://vimeo.com/channels/performanceacademy/27805932> consulted September 2011.

he uses video, in which he compartmentalizes the bodies: he uses video “thinking” in the way we (in our head), edit(ing), in order to get the body to distort, to occupy the space. This is very much in tune, or i drew a lot out of that, of that way of thinking into the Performance.

Also, Klaus Obermayer that also does a lot of body distortion, and video concepts into the dancers performance. You might see a dancer on stage just for example doing a really slow movemt with just his/her arm and on the back there is a video projection on the back where the arm becomes a lot longer and distorted. That by itself is a really simple distortion of one part of the body becoming a huge thing by itself: hypnotic and poetic.

I find this way of working really poetic in the way it connects to all the different parts, and in the way, it really looks at all the parts in the system, taking us back to the beginning of this conversation where i was talking about models of communication and of how we are a part of a system, and that’s how we operate. So, for me and my work the multilayered, the multimedia, the multidisciplinary has to do with reconnecting or putting back together ourselves as human beings.

“DANCE”

By looking and by working with dancers I find that it is extremely frustrating to get the two languages together. Technology and Dance are very hard to marry because of the “bulkiness” of technology and the way it has been used up until recently.

I think that if you give a dancer a suit that is full of wires and full of batteries and it does not allow the dancer to do what they do best which is to dance. They can’t for example roll on the floor because they have all this thing attached to them. I see a lot of frustration around trying to marry this two things that are extremely hard to marry. Still we are trying to get this to work and it’s frustrating. To the extent, my own experience tells me that a lot of dancers actually do not want to participate so much in dance and technology projects anymore because they feel like rat labs, when we are trying to make all this thing work and that can be extremely frustrating.

But nowadays there are some really interesting ways of working are emerging with the new cameras, the new 3d cameras, the mocap that for example allows for us to be recorded, and let’s say operated in an non wire, non-intrusive way. This really is helping.



I also think that if we are working with dance, we have to let dancers, dance. That for me became an obsession in my research: to not stop dancers from doing what they do best which is to dance, to be connected with their own bodies. That is when, when you have that, the performance comes through and you can really work with the physicality of it all. We can't immaterialize dance to the point of virtualizing it into light and so the bodies are not there anymore.

#### “FACILITATING PERFORMANCE”

Given my obsession with non-intrusive technologies for dancers to interact with video I created this system i called “Live Film Performance Facilitator which allows for a live film to be created in front of an audience. The way it works is that you have: the stage. I am on stage with the dancers, stage left with a table in front of me, my back to the audience.

Rolls and rolls of white paper on this table. I also have colored charcoal, watercolors and all this different mediums for painting and for drawing. So i draw on the white paper, it's not done on a computer or a tablet, that for me is really important as it draws from fine art and does not draw form technology as such. And then there is a video camera looking into the drawing i am making, recording those drawings. It is plugged into a video projector which is on the stages “ceiling” projecting down onto the stages floor were the dancers are.

The stages floor is also white. Long stripes of white paper, the same type of paper i am using for the drawings. They are dancing on top of that paper.

When it all starts all you have is whiteness. The whole stage is white, my table is covered in white paper.

So once i start drawing that is the prompt for the movement. So, that is the cue for the dancers to start interacting.

So i draw and the dancers react instantaneously to the drawing that is being made (projected) on the floor where they are moving. So, it's really just about the drawing being immerged on the environment where the dancers are. It's a truly interactive environment for them. So, that is one aspect of it.

The type of drawing i do is very gestural, its very abstract, it has a lot to do with paths, to getting to get the dancers to move in the space, it's really a prompt for movement:

It's just saying "come here" or "let me take you there".

The way i work with the dancers then it's to create a language where they can improvise with the drawings in such way that they can always to decide to take the prompt or not, pretty much like we do in real life when we talk to each other when someone gives us a prompt for whatever it is in life. We can always choose to take it or to leave it.

If we are having a conversation i might decide to answer your question with another question so we can carry on or i can just say yes or no and not take it at all, and i leave.

That's the way i work with them.

The whole system works and operates with the concepts of film editing, and video editing.

I have a camera here in front of me looking at this drawing. If i want a dot to become really big i just press the zoom, i zoom into that dot and immediately on stage you get this tiny little dot that becomes huge. You get the stage also "moving really fast". If i want i can stop it, fast forward it, i can rewind it. I can cut it, i can past it i can do pretty much with the camera anything i want there and then and it gets instantaneously projected on stage (floor). That's another aspect of several.

The dancers they can also came around and draw and can also come around and bits and pieces of their bodies on the video projection as well. You might get a hand coming into screening, a small or a big one depending on the zoom, so it is very interactive. It's very playful and its very easy to want to be a part of it. So, in terms of participation, that we were talking about earlier on, for me there is a lot of that, i get a lot of that. People want to jump in; Literally the audience wants to be part of the project as well because they want to be part of that connectiveness.

The system itself to resume has life drawing, the sound for the piece is a different aspect of the communication because instead of being operated by a human being, like the artist that is doing the drawings, me, that has a human relationship to the dancers, with the sound i have decided to do it through a computer.

So what i do is that i work with an application that a colleague of mine from my PhD has developed, his name is Andre Baltazar. He has created this application that is

also very simple. With another camera that looks at the drawings i am making, and depending on the colors i am using, allocated to each color there is a sound or a sample of sounds, on the last performance we had 4/5 samples of sound. So, depending on the color, if i was painting in blue a sound would come up, if i added pink another sound would come on and so, the composition of the music was also done there and then: because of the drawings as well. It was an experiment, it wasn't meant to sound good, it wasn't an esthetic composition, but it was very experimental in the sense that the dancers were responding to the drawings, but the music was also being created by the drawings. Everything goes through the drawings and leaves the dancers free to dance and not to have to operate the system.

The system is really being orchestrated and operated by the person that makes the drawings, which in this case is me.

#### “INTERACTIVITY”

The model of interactivity i would like to see is transposed from the way we human beings interact with each other. So the way in which that we not only communicate orally but also the way in which we are part of a system and we always work as parts of that system. We function in society and we function in relation to other people to other system, to Nature to the Universe. That is how we function. So, the model of interactivity that i work with and that i would like to see is when we transpose that same model of communication or the way we dialogue with each other. A dialogue not a monologue, so when we are talking about interactivity we are talking about something that responds in a way that when you say something to the system you get a response, but you say something back, you have a dialogue constantly going on So that is the model i would like, it's a systemic one. That's the way that we human beings relate to each other at all times. That's how i see it.

We are part of a system and we relate to the parts, and the parts relate to each other sometimes in different ways as well. That is that saying that “we are all connected to each other, i don't know how many times that we would have to search until you find someone that knows someone that, knows someone that knows...so we are all connected in a way.

There are different ways that we can look at this, we can look at it with a more down to earth model with the simplest models of communication or we can go and look at

spiritualism that also looks at us as part of the universe. They are just different ways of looking at the same thing. As human beings, we interact, that's what we are designed for.

All this quest for interactivity comes really from our Absolut need to connect and to interact. Hats what we need to do as human beings. So i do want to hold on to the notion of Interactivity, cause that's where it is drawn from, for me, from the notion that human beings need to interact.

Participating in something is something else that human beings need to do.

Nowadays if you think about it we are spending hours and hours on end by ourselves in front of a computer we are interacting with other people, you might be for hours talking to someone in a chatroom were you are interacting in some way but at the same time you are not participating on. We rare now doing it in a totally different way. We are moving away from the physicality of contact because we spend a lot of time on the internet connecting in other levels, so when we thing nowadays about the integration of digital media (are we using computers to do it?) or how are we connecting the media and how are we connecting to other people as well? We are moving away from the notion of participation i think and we are doing it in different ways. Although i think that there is a big part of us that wants to participate so that is way people work in certain ways: i do, i set up systems that allow people to come in and to participate in a very specific way.

#### “PERFORMANCE/ TECHNOLOGY”

The first time i encounter the intersection between technology and performance was when i started looking into the late 60's and 70's. Merce Cuningham was one of the very first artist i encountered trying to integrate video into live performance. So when i talk about the interaction between technology and live performance, or dance i am pretty much looking at the integration of video: live moving image onto live dance performance. But even when we talk about that there are several different ways in which that can be done.

One thing is to have a video projection as a backdrop for a dance performance and another thing is what we are talking more of nowadays of it being interactive or having situations where the technology is actually starting to interact with the human

being as well as the human being with the technology. Those are two totally different situations.

Merce Cunningham used a lot of video in his performances and he used sound in a very specific way, projecting the video into a backdrop and was using several different kind of effects in order to get layer into the Performance.

But if we talk about fifteen years ago for instance, people like DV8, a physical theatre dance company using holograms within dance performances that are being projected into water curtains so you get a three dimensional dancer in the performance and dancers can actually swim through it. That is a totally different setting for a backdrop with a video projection.

There is also the Random dance company with McGregor doing sandwiches of virtual reality with dancers which works in a totally different way again. So, you have a transparent net at the opening of the stage with a video projection, then you have the dancers in the middle dancing the same choreography, and then you get another video on the background, so you have several nets that are picking up this video projection, and in between the nets you have the dancers dancing. So, when you are watching you don't know what is real and what is virtual anymore, because you have this sandwich of video and dancers.

So, this are just some examples of different ways of integrating.

There are also people working with television monitors on stage, i have myself done that.

That is again turning into the materiality of the object that plays the video: We used to have huge television monitors in the past and nowadays they are just very thin and flimsy things against what a projection is which is just a projection of light, immaterial in that way. It just exists when it hits something, so we always need some kind of backdrop or some kind of surface were the video can actually exist.

That can also be the dancers body.

People like forced entertainment that are working with that concept.

It really is a never-ending story if we start looking at different ways or integrating technology, and i am only talking about video, not yet about sound, light, interactive media.

## **5 Conclusions and Future work**

### **5.1 Conclusion**

Human mediated technology interaction proved to be an effective strategy in live performance, as we can see on “Untitled1” and “Bela and the Belly”

The feeling is that LPPF has been a successful endeavor. In all experiments the idea of having an experienced “Live performance facilitator” at different stages of the interaction loop became a crucial aspect.

Apart from all the different elements that were considered in this paper and the liaison between them to create a piece and a structured system to promote the cohabiting of video technology, improvisation dance, interaction, sound, drawing in a live performance context, there was a certain amount of magic in the piece that cannot be undermined. The image of watching a person drawing on top of another has a certain poetry, which can be associated with the imagery of films like “The Pillow Book” by Peter Greenaway. Another strong point was the simplicity with which the technology was laid bare allowing the audience to be included in the process of the piece.

Many members of the audience mentioned they felt like jumping into the piece while it was happening. For me that is a huge accomplishment in the sense that we managed to pass onto them the honesty, simplicity and above all, the fun we had during the whole process.

Maybe I can consider public participation on future pieces.

It is the intent of this project to encourage Dance and Performance Artists to think abstractly about Video Technology instead of the technical barriers that generally come with not knowing how to operate it. ‘LPPF’ is proposing to develop a new approach to relationship between performer and stage better still between performance and its special environment/context. It offers innovative possibilities without being intimidating. Once in place (once set up) it provides a new approach

for artists to collaborate, it provides a common ground for Dance Performance and Fine Artists to merge their skills through experimentation with a live performance as the ultimate goal.

The Performance created with LFPP titled “Untitled 1”, brought to light many of the challenges and needs dealt with when technology meets live performance. The performance titled ‘Untitled1’ was born out of Film concepts. It was indispensable to test and explore the language of film in a Dance Context (in the Theatre and within a Dance Audience) and the true nature of interactivity between film, the stage environment, sound and the performers both dancers and painter.

The performance video piece titled “Bela and the Belly” was also born out of film concepts, it initiated with the fact the dancer was very pregnant and a video projection on the body could be a gentle way of introducing visuals into the body. So, in this case, the pace was very gentle and caring because of the physical needs of the dancer. A first video was shot with the dancer dancing outside on the grass and then that layer was projected onto her belly and filmed again. That is what the final layer of the video looks like. Nevertheless, the sound of the piece was again created through the video, through the visuals. The application looks at the projected final version of the film and translates the amount of light and reflection on the video into a feedback sound.

The video titled “Howling Arm” is an experiment where the sound of the video was created within the piece and not with any external sounds incorporated. The sound from the performer’s voice, the sound from the analogue instruments on her arms that reacted to her movements and finally the manipulation of the final sound by a sound artist. Also, the video was created with several layers of the same image with a second delay between them to convey a more three-dimensional image to go with the 3 stages of sounds incorporated.

So, to conclude there are Common denominators between ‘Untitled 1’ and ‘Bela and the Belly’: Human mediated technology and computer mediated technology, Freedom for dancers - no movement constriction and no need to manipulate the technology, Collaborative structures and Video technology + Laptop (Max MSP). The piece ‘Howling Arm’ has the characteristics of wearable portable analogue sound technology, of looking at non-computer mediated sound machines. It is a small, intimate dance and sound creation

And it is looking at constriction boundaries of a small analogue gadget in the body. The result being a film where the sound was all created within the piece itself and no external sounds were brought in.

There are various ways in which Video and Technology are nowadays integrated into Live Performance. It is only natural that the marriage between these elements is going to create an increasingly fluid language for the future. I feel it is essential to think about creating a performance language which supports the ideas of artists, therefore the technology at the service of the artists and never the other way around. That is the idea when I refer to technology in the introduction as a tool for developing creativity. The goal with “Untitled 1” was to create an ephemeral experience, a live film performance that would not start before human movement happened. The true interactivity of this piece relies on relationships between all the elements but above all between the performers dialoguing.

“Untitled1” relies on the fact the technology was laid out before the audience; it is clear, simple and honest.

Personally, and artistically, that is the magic and the challenge – to make the virtual become real, accessible, easy to grasp, and to be creative with it.

I cannot envisage life without recording devices. I was born in 1973, and Super 8 film cameras were widely available. From physically cutting film and mounting it with tape to developing black and white photographs in labs, these have shaped my reality for me from a very young age up to the present day. Therefore, I must say the development of technology for me has been quite logical, I see a lot in common between the software available nowadays to edit video and the old pair of scissors to cut film. This is to say I do not have knowledge of reality with recording devices. Learning how to draw in Art College gave me a background in representing the world around me in many different ways, therefore when I think about representing the world I will always have an image as a result. Coming from a Dance and Theatre background gave me the physical context and embodiment in my work and way of seeing the world and reflecting about it. Television and Media culture also play a huge part in defining my cultural background. I do remember life without Internet, computers or mobile phones, and today I believe I could not live without them. We are now users of Art, as we are users of Internet sites and technology of many sorts. In being part of an interactive world, that requires an active audience. Where will the



technologies, which are nowadays as foreign as the first camera ever, invented, take us in the future?

I am very excited about being one of the people who is contributing for the writing of this vocabulary.

## **5.2 Future work and Examples of different ways of using the system already tested**

Dance Performance, EDge 2013. 7th of June 2013 at Casa das Artes de Famalicao. Live Video by Sonia Rodrigues, reacting to the dancers on stage. The drawings were being made in real time as the show ran. Part of Phd project at Universidade Católica do Porto, Citar.

EDge, London Contemporary Dance School PG Company), Alem da Danca Dance School, Casa das Artes Famalicao and Camara de Famalicao with the Local Community and Sonia Rodrigues, had a one week workshops with the company, around 100 kids and Rodrigues using the system of LFPPF in a different manner from “Untitled 1”. Only the video circuit was used, not the sound, and the video projection was on the back of the stage due to the amount of dancers involves who had ages between 3 and 23 years old. The system proves to be very adaptable. Apart from drawing, object that related to the performance were projected as well. Just to give an example when the dancers had as props white balloons, the video projection had lots of white beads necklaces that were the moves very slowly as the dance occurred. A simple but poetic and effective way to interact with what’s happening on stage. Although this time the dancers did not react to the projection. The artist making the drawings and using several objects behind the camera was the one in charge to react to what the dancers were doing.

Since the show in February 2004, LFPPF was used in a Live Dance Show in Portugal with “Neuza Rodrigues Dance School”. It was used in a different manner, and that proves its versatility in terms of applicability as long as creative people use it. Children danced the dance show and students aged between two and a half and twenty-five years old, the choreographies had already been created, and I made a back projection on stage. The projector was again linked to a camera recording a table covered in white paper with a strong light on top of it. I reacted to their

movement with drawings creating a live stage setting. Again, the audience was well aware the drawing were being made live, and I had the chance to incorporate drawings the students had made on a fine art workshop they attend in dance school. This project again opened new possibilities for integration of new elements in dance performances, and who knows on the next one I might be able to invite some of the students to draw? Drawings made by the participants during rehearsals as well as sentences they wrote while creating the choreography were used as projections as well as simple props in front of the camera. For example white beads were projected when a dancer comes on stage holding lots of white balloons and the beads on the projection where being moved very slowly to convey a sense of liveness to the background and going with the music played. Another example are lots of strips of white paper that were being placed in front of the camera and becoming a three dimensional structure on the stage projection, and it was then during that dance piece being blown to make them move quite slowly to convey a simple sense of poetry and magic to the piece.

Therefore, issues like participation, education, people with special needs, inclusion, artistic and poetic aesthetics are coming to the future of how to use this system and how to incorporate different items and concerns into its frame.

Public participation on future pieces can also be considered as mentioned before.

I also envisage LFPF being used in dance choreographies, I would find it very rewarding to work collaboratively with a choreographer and establish a new set of rules for the creation of a language between drawing and the choreographer's movement language.

It can be used in any live performance situation as long as the environment/spatial context can be interchangeable with the performers.

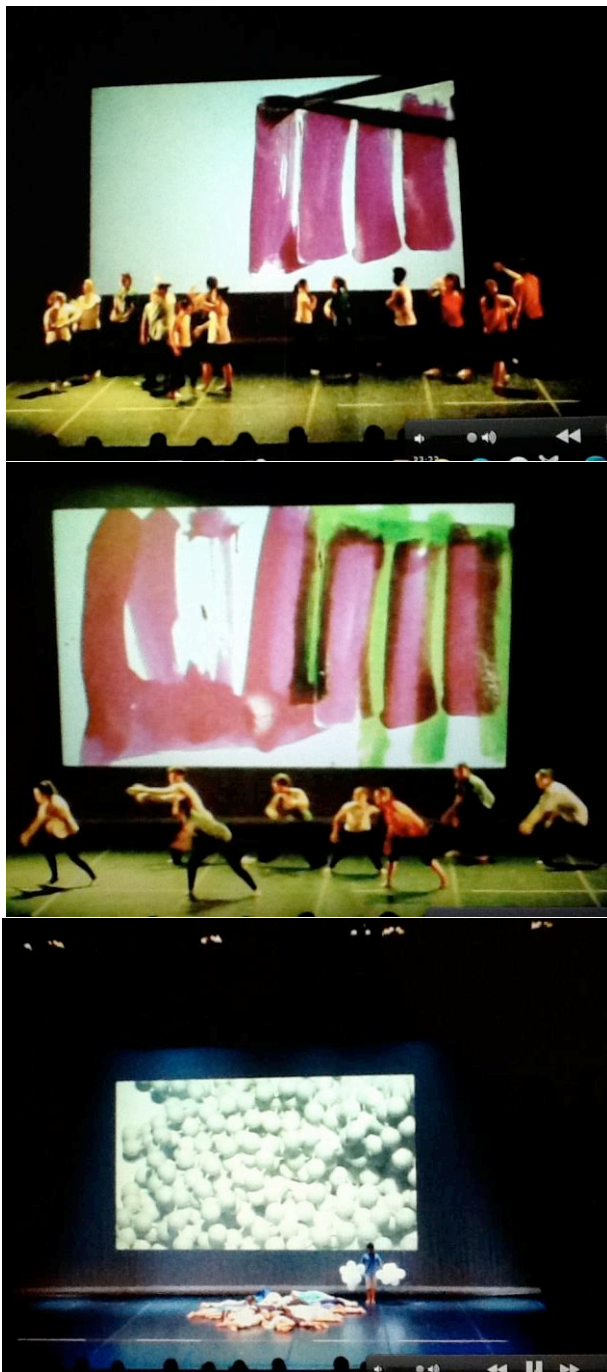


Figure 15 Performance with Edge 2013, video by Sonia Rodrigues 1.

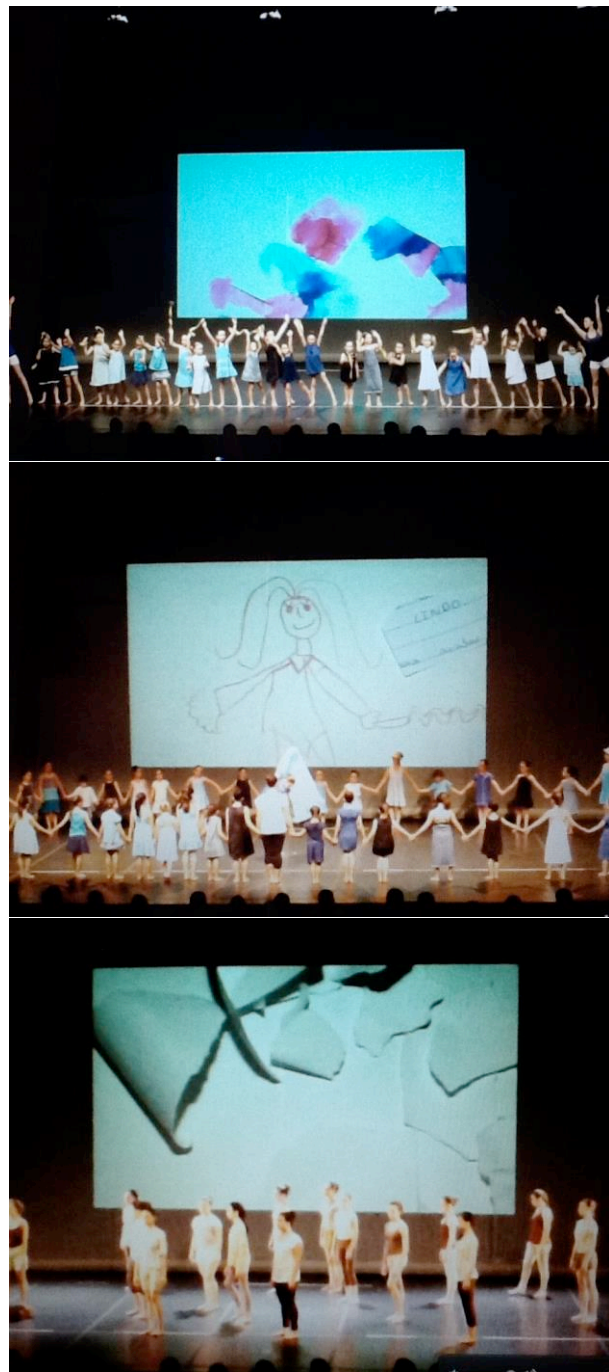
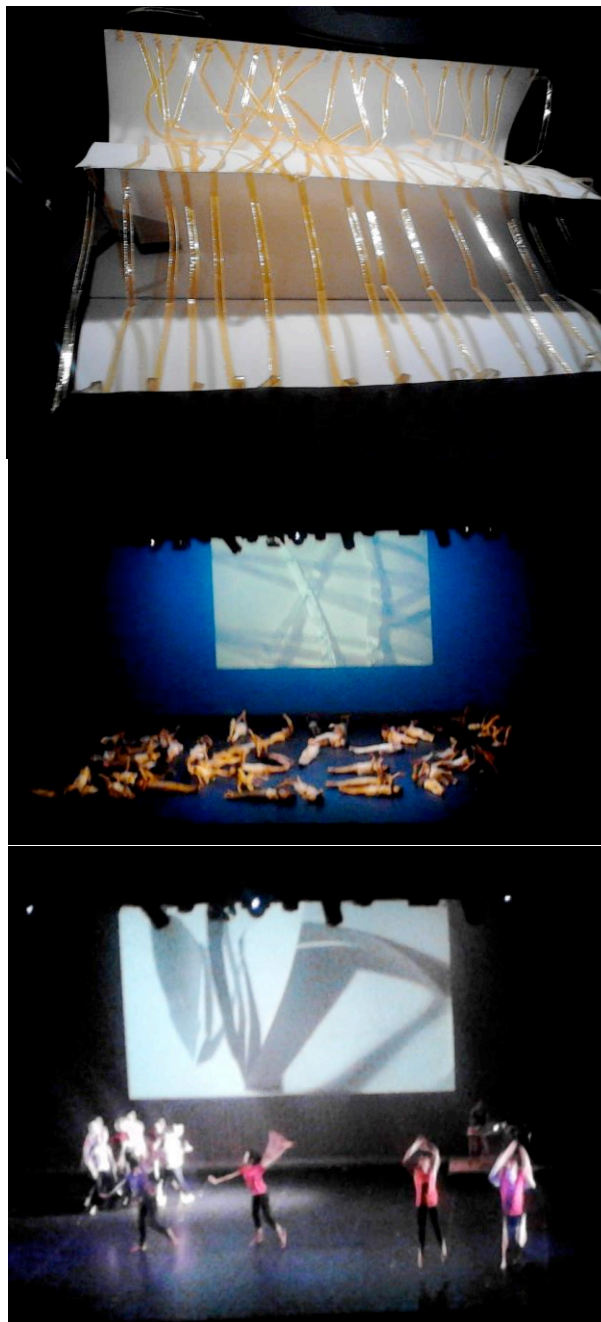


Figure 16 Performance with Edge 2013, video by Sonia Rodrigues 2.

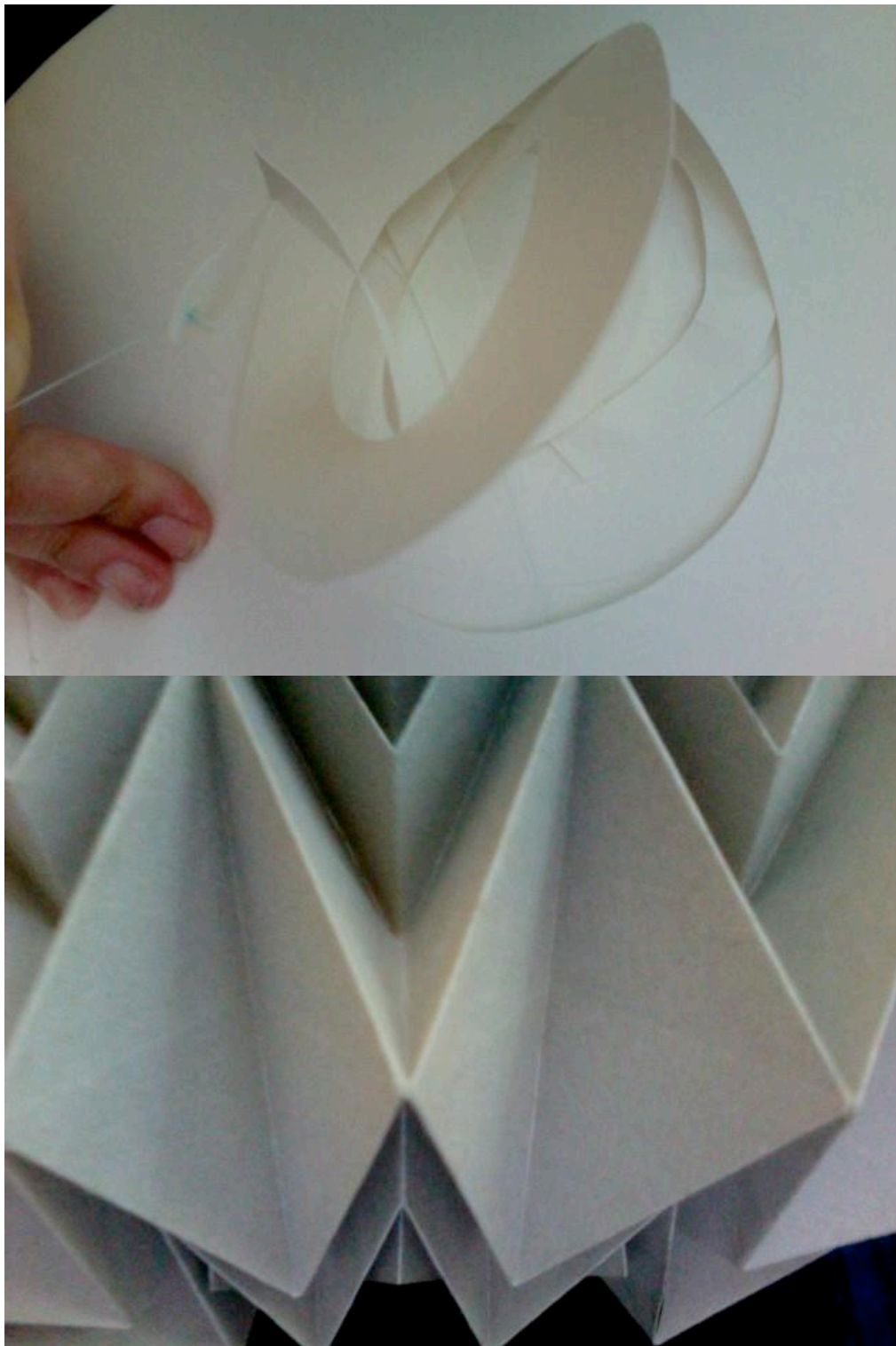
**There was another performance in July 2014 at Casa das Artes de Famalicao, again using the same system as the previous one stated above.** It was with the London Dance Company EDge 2014. Live Video by Sonia Rodrigues, reacting to the dancers on stage. This time no drawings were used, only origami's and folded pieces of paper as well as pop up books. The images were projected onto the back of the stage. It proves how versatile the system is. It was being made in real time as the show ran. Part of Phd project at Universidade Católica do Porto, Citar.

EDge, London Contemporary Dance School PG Company), Alem da Danca Dance School, Casa das Artes Famalicao and Camara de Famalicao with the Local Community, Mariana Tengner Barros and Jonny Kadaver and Sonia Rodrigues, had a week workshops with the company, around 100 kids and Rodrigues using the system of LPPF in a different manner from "Untitled 1". Mariana Barros choreographed part of the piece and collaborated with musician Kadaver to create one part of the piece. On that part, white origamis were used because it was very full of color and energy also with the live music on stage and it called for a calmer setting on the background. Nevertheless, the background origami moved and was being pulled by strings to create a three-dimensional feel to the stage. The rest of the piece was choreographed by the company EDge and more colorful imagery was used, since the children were younger and the show called for more color and more movement in the background. Also, the music wasn't live in those parts.

Only the video circuit was used, not the sound, and the video projection was on the back of the stage due to the amount of dancers involves who had ages between 3 and 23 years old. The system proves to be very adaptable. Apart from drawing, object that related to the performance were projected as well. Just to give an example the origami's were produced to fold and unfold with the dance and the pieces that were being pulled by strings were reacting to the dance on stage. A simple but poetic and effective way to interact with what's happening on stage. Although this time the dancers did not react to the projection. The artist making use of the origami and pop up books and using several objects behind the camera was the one in charge to react to what the dancers were doing.



**Figure 17 Performance with Edge 2014, video by Sonia Rodrigues**



**Figure 18** Examples of origamis used to project onto the piece

The system proves to be versatile and to have different possibilities in terms of what the elements that constitute it might be. It's very easy to adapt, by inviting different

artists, dancers, choreographer and musicians into the setting. The future will bring the possibility to enhance even more the interactive possibilities and be playful with the elements integrated.





Figure 19 Drawing by Ana, 5 year old about the multimedia piece she participated in with LFPF

This image is a gift to me. It was made by one of the kids I worked with, Ana, and she explained what it is : “It is a multimedia piece, Sonia records us on stage and projects onto the floor or onto the back.” I have started working with interaction between video and dance with very young dancers around 15 years ago. The LFPF system only came to life around 6 years ago and it started being tested and used in small experiments until it got integrated into the Doctorate thesis and research and had a chance to be tested methodically and with sustainability. The results all over this 5 years and experiments have been challenging, thriving systematic and exciting. It still carries on being all of that as recently in July 2014 another performance with 100 youngsters was performed.

I am very proud of this drawing, because it means to me that I am reaching really young kids with this project and getting an expression in drawing of what they feel like. In the drawing, we can see the 3 dancers in the front and the video projection onto the back. I am very proud to have 5 year olds drawing my system,

understanding it and being creative about it. This is the future for a lot a people involved and for myself. Thank you for the journey, to everyone who was a part of it.

## ANEX 1

Australian Dance Theatre is Celebrating 50 Years in 2015. Under the directorship of Garry Stewart, Australian Dance Theatre creates dance that is an intelligent progression of the art form engaging audiences the world over.

Australian Dance Theatre is Australia's pre-eminent contemporary dance company and the longest running in the country. For almost 50 years Australian Dance Theatre has pioneered new work that has contributed to defining dance in this region. In "Devolution" Garry Stewart collaborated with Canadian roboticist LouisPhilippe Demers, UK video artist Gina Czarnecki and London based costume designer Georg Meyer-Wiel to create a startling and unique world. Situating humans in communion with 30 robotic machines and prosthetics, Devolution explores the relationship between robotic and human performers within an artificial ecosystem. Imbued with ritualised process Devolution explores mutualism, territoriality, parasitism, predation, symbiosis and senescence to suggest that in the midst of technology we remain subject to the instincts of the flesh.

Devolution won the Helpmann Awards Best New Australian Work and Best Lighting in 2006.<sup>55</sup>



Figure 20 Devolution by the American Dance Theatre.

---

<sup>55</sup> <http://adt.org.au/current/work/> consulted in March 2012

The Musical Gestures project is a research project of the University of Oslo, Department of Musicology, jointly funded by The Research Council of Norway and the University of Oslo.

This is a broadly conceived research project on music-related gestures, based on the conviction that there are intimate links between music, understood as sonic art, and gestures, understood as human bodily movement. There are many different types of music-related gestures in performance, dance and other activities, but they all attest to the primordial role of human movement in music. In fact, we believe that our images of movement are so ingrained in our images of musical sound that images of movement determine how we perceive, remember, imagine, learn, and make music. The primary objective of the Musical Gestures project is to work towards a coherent theory of the relationship between musical sound, human gestures and musical concepts, and there are some secondary objectives linked to this:

Refine techniques for capturing, processing, and representing music-related gestural information.

Classifying music-related gestures and develop useful overviews of gesture types within different contexts and styles.

Understanding gestural coding of music by exploring the links between sonorous and gestural images in musical memory and imagery.

Demonstrate practical applications of musical gestures as tools in performance, improvisation, composition, and music education.<sup>56</sup>

EMPAC — The Curtis R. Priem Experimental Media and Performing Arts Center— is where the arts, sciences, and technology interact with and influence each other by using the same facilities, technologies, and by breathing the same air.

Situated on the campus of Rensselaer Polytechnic Institute, EMPAC is dedicated to building bridges between our human senses, to modes of perception and experience, to creating meaning in a physical environment, and to the intangible world of digital technology.

---

<sup>56</sup> <http://www.fourms.uio.no/projects/mg/index.html> - The musical gestures project, 25<sup>th</sup> November 2012.

Four discrete venues are designed with unique technical infrastructure to enable you, the audience, to see, hear, and move in space in endlessly different ways. They host artists and researchers to create new work and present events which ask you to join the quest for new perspectives.

“EMPAC aims to create an environment of fertile creation, cross-pollination, and intellectual stimulation. Visiting scholars and researchers will participate in the formation of an intellectual community in scientific and engineering disciplines that may also engage perceptual and artistic knowledge and practice. EMPAC will also be a platform for research activities in areas such as augmented reality, virtual reality, scientific visualization, audification, haptics, human/machine interfaces and interaction, auralization, and multi-modal modeling in large-scale, fully media-integrated environments. Offering from Conferences, Discussions, Performances, Screenings, Talks, workshops, research, residencies and commissions.”<sup>57</sup>

The Open Ended Group comprises three digital artists — Marc Downie, Shelley Eshkar, and Paul Kaiser — whose pioneering approach to digital art frequently combines three signature elements: non-photorealistic 3D rendering; the incorporation of body movement by motion-capture and other means; and the autonomy of artworks directed or assisted by artificial intelligence. Their artworks span a wide range of forms and disciplines, including dance, music, installation, film, and public art. In the field of dance, they have worked most closely with Merce Cunningham ( *Hand-drawn Spaces*, 1998; *BIPED*, 1999; and *Loops*, 20018), but also with Bill T. Jones (*Ghostcatching*, 1999 and 22, 2005), Trisha Brown (*how long does the subject linger on the edge of the volume*, 2005), and Wayne McGregor (*Choreographic Language Agent*, 2007-present, and *Stairwell*, 2010). Their public artworks include *Pedestrian* (multiple sites, 2002); *Enlightenment and Breath* (Lincoln Center, 2006 and 2007), *Recovered Light* (York Minster, 2007), and *Crossings* (Nuit Blanche/Royal Ontario Museum, 2010).

In recent years OpenEndedGroup has created new approaches to 3D projection, which has resulted in works of digital cinema such as *Upending* (2010) and *All sides*

---

<sup>57</sup> <http://empac.rpi.edu>, consulted in April 2013

of the road (2012); the shorter installations After Ghostcatching (with Bill T. Jones, 2010), Stairwell (with Wayne McGregor, 2010), and plant (2011); the interactive installations Into the Forest (2011) and Drawn Together (2012); and the chamber opera Twice through the heart (with Mark Anthony Turnage and Wayne McGregor, 2011).

Among the prizes they have won individually or collectively are a Guggenheim Fellowship, the John Cage Award from the Foundation for Contemporary Arts, a Media Arts Fellowship from the Rockefeller Foundation, and a Bessie award for the BIPED decor.

They have presented their work at Lincoln Center, the New York Film Festival, the Barbican Center, the Hayward Gallery, ICA Boston, Sadler's Wells, the Festival d'Automne, the Sundance Film Festival, the Detroit Institute of Art, the Rome Film Festival, the Museum of the Moving Image, SITE Santa Fe, EMPAC, MASS MoCA, the MIT Media Lab, ICA London, Jacobs Pillow Dance Festival, the Centre for Contemporary Art (Glasgow), the Kiasma museum, and other venues.<sup>58</sup>

Random Dance Company/Wayne McGregor: Random Dance was founded in 1992 and became the instrument upon which McGregor evolved his fast and articulate choreographic style. With collaboration at the centre of his practice, McGregor has innovated new work with world class artists including composers Scanner, Jon Hopkins and Ben Frost; visual artists Mark Wallinger and rAndom International; and film-makers Jane and Louise Wilson and Ravi Deepres. Collaboration with science and technology communities has also fuelled choreography mined from radical cognitive research processes. This unique, tenacious questioning between artists and artistic mediums, across the interface of science and art, through the body and mind, has ensured that Wayne McGregor | Random Dance has remained at the forefront of contemporary arts for the past 20 years. Wayne McGregor/Random Dance is Resident Company of Sadler's Wells, London. Wayne McGregor is Resident Choreographer of The Royal Ballet. In January 2011, McGregor was awarded a CBE (Commander of the Order of the British Empire) for Services to Dance.

---

<sup>58</sup> <http://openendedgroup.com> consulted in August 2012.

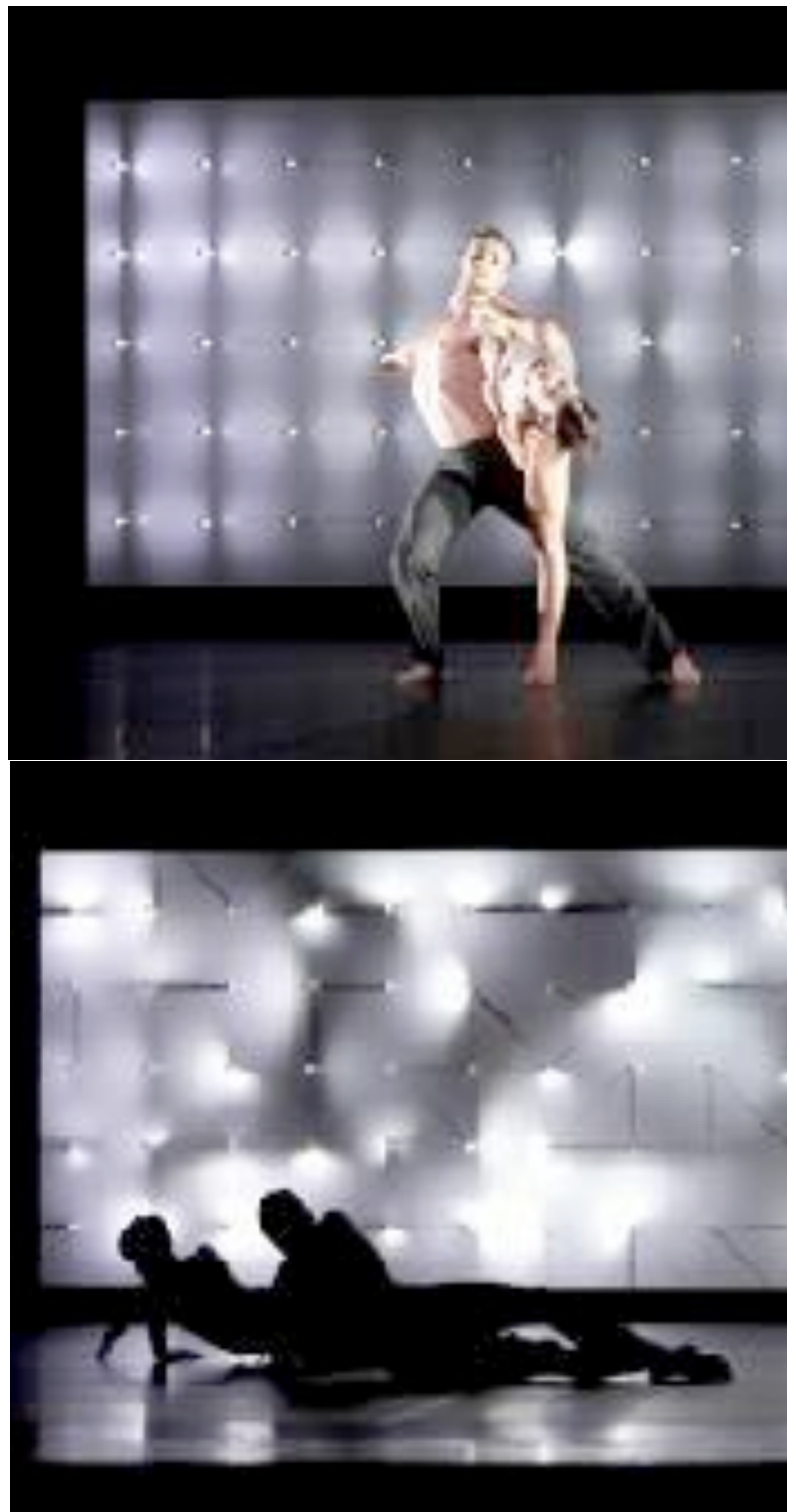


Figure 21 Random Dance Company performing “FAR”.

DV8 Physical Theatre was formed in 1986 and has been led by Lloyd Newson. DV8 Physical Theatre's work is about taking risks, aesthetically and physically, about breaking down the barriers between dance and theatre and, above all, communicating ideas and feelings clearly and unpretentiously. It is determined to be radical yet accessible, and to take its work to as wide an audience as possible. DV8 is motivated by artistic inspiration and creative need: these, rather than financial, organisational and touring demands dictate the creation of new works. Great emphasis is placed on the process by which new work is created. The company has fought successfully for funding to cover lengthy research and development periods in order to maintain rigorous artistic integrity and quality in each new project. The focus of the creative approach is on reinvesting dance with meaning, particularly where this has been lost through formalised techniques.

DV8's work inherently questions the traditional aesthetics and forms which pervade both modern and classical dance, and attempts to push beyond the values they reflect to enable discussion of wider and more complex issues.

DV8 (Dance and Video 8)'s strong commitment to film and video continues. This reflects its ongoing interest in how two primarily visual media can enhance one another and reach a crossover audience from within both forms.

The company's reputation relies on pushing its own boundaries and on the constant re-examination of the roles and relationships of men and women in our society. Its policy insists on the importance of challenging our preconceptions of what dance can, and should, address.<sup>59</sup>

### Tanzquartier Wien

"But paradise is barred and the cherub behind us; we'll have to make a journey round the world and see if it's open again somewhere round the back" (Heinrich von Kleist)

The Tanzquartier Wien (TQW) is one of the most important dance houses in Europe when it comes to thinking ahead and promoting contemporary dance and performance and the related theoretical discourses and standpoints. Against the background of a transdisciplinary understanding of art that is also reflected in the

---

<sup>59</sup> <http://dv8.co.uk/about-dv8/artistic-policy> consulted in March 2012



location of the TQW at the centre of the MuseumsQuartier, the tracing of contemporary developments and pioneering tendencies in dance creation and the dialogic proximity with arts determine our actions as well as the formats.

Artistic processes are important to us: we receive, initiate, care for and protect them, but also share their risks. To take up open ends, to continue them and mediate in between working process and production are the central motivations for curating the international guest-performance programme, local and also prospective international co-productions, artists' residencies, the workshop and training programme or open project forms that promote the aspects of artistic research.

An integral component of programme design and development is the theoretical knowledge of dance and performance, which the TQW has played a decisive role in extending since its foundation. The advanced and continuous development of theory will continue to be related to historical concepts and the interest will continue to focus on linking the articulated and the unarticulated in artistic and theoretical practice and on questioning.

Since the 2009/10 season, particular thematic attention will be given to the analysis of the choreographic: as a space-time structure and formative principle, as a dynamic and perception-oriented dialogue with the spectators or as the moment where artistic creation and social-societal development meet, the constituent aspects, processes and effective forms of choreography will continue to be the focus of concentrated thematic intensification. This is not a question of the affirmation of dance in distinction to other arts and design principles: beyond the utilisation and adoption of media, we are rather interested in the choreographic understanding in dance, performance and other disciplines and in a speaking "in" and "with" choreography, which implies transcending and breaking the limits of the art form. Furthermore, it also involves an opening to a "choreography of the social", that is to elements and dynamics of moving and being moved in culture, society and political life.

The open house will become an even more hospitable space. The TQW is simultaneously the location and the act of encounter with contemporary choreographic art and actively seeks to create openings and motivations that facilitate a differentiated analysis of dance and performance, yet without making it a necessity. In a contemporary gesture of invitation, alongside the existing audience

who are interested in discourse, we are turning to spectators who are interested in sensual perception but also increasingly in the analysis of dance and performance. Beyond an essential welcoming, the rights and obligations of hospitality, of territory and (artistic) languages also become relevant. The aim is not absolute understanding. Rather it is a question of taking the asymmetries, gaps and sense experiences that are opening up as a challenge for an enthusiastic exchange of art and theory, audience and artists. This too is hospitality and involves the role of the TQW as an institution at the centre of the discussion.

Together with the artists and the audience, we would like to propose paths through the diverse topographies of the choreographic landscape. To turn upside down the contemporary and the historical, the existing and the still fictional, to turn it inside out and to set out on a journey and enthuse for the participation in the most exciting art form of the present and the future.”<sup>60</sup>

Charleroi Danses: “An off-shoot of the former Ballet Royal de Wallonie, the Choreographic Centre of the Wallonia-Brussels Federation has taken a radical turn towards contemporary creation.

Frédéric Flamand, its director from 1991 to 2004, made it a leading institution on an international level. It has been directed since 2006 by a quartet of artists: Michèle Anne De Mey, Pierre Droulers, Thierry De Mey and Vincent Thirion. This new management set up an open project – a broad association of artists with an interdisciplinary dimension – centred on artistic work shared with choreographers and artists from the French-speaking Community but also from the international scene, while maintaining a continuous interaction with audiences.

While the creative work of the three artists/directors lies at the heart of the activity of Charleroi Danses, the Centre offers custom-made residencies in accordance with the specific requirements of the artists. The activities of Charleroi Danses take place in Les Écuries of Charleroi and at La Raffinerie in Brussels: including the production

---

<sup>60</sup> <http://www.tqw.at> consulted in September 2011.

and touring of the work of the artists/directors and residents, and the programming of various events such as the dance Biennale.

Charleroi Danes offers a year-round Training Programme for professional dancers in the form of classes and workshops, and it organises master classes and ‘laboratory spaces’ led by the various creative artists of the Centre. In collaboration with the schools, Charleroi Danes has also set up a programme of artistic workshops under the ægis of the D.A.S. (Dispositif d’Accrochage Scolaire) in Brussels as well as a series of interventions for dance appreciation with the schools of the Hainaut region of Belgium.”<sup>61</sup>

During the course of this thesis, a piece by Charleroi Danes is discussed, “Metapolis, Plan K”.



Figure 22 Metapolis, Plan K by Charleroi Danes

DAP-Lab is a cross-media lab exploring convergences between performance, telematics, textile/fashion design and movement, clothing and choreography, visual expression, film/photography, and interactive design.

---

<sup>61</sup> <http://www.charleroi-danes.be> consulted 17<sup>th</sup> November 2012.

Founded in 2004, the Lab is now housed at Brunel University and continues research partnerships with multiple sites in the USA, Japan, and Brasil which have formed the ADaPT network on performance telematics since 2000. DAP-Lab also connects ongoing research investigations and productions in dance (Digital Cultures) with performance/science collaborations (TransNet), and brings these partnerships into knowledge transfer with performance, multimedia and electronics engineering research at Brunel University's School of Arts and School of Engineering and Design

Dance Digital<sup>62</sup> DFID Digital Futures in Dance was a conference Sonia Rodrigues attended in Bournemouth (UK) in September 2011.

As part of the conference Rodrigues had a chance to take part in a seminar by Marlon Barrios Solano who is the founder and director of Dance-tech.net and Dance-tech.tv which explores the potential of the new Internet technologies for knowledge production and distribution on body based artistic practices and it's intersections with other disciplines such as new media, architecture, philosophy, anthropology and more.

“All dance-tech projects attempt to place embodiment and the social/cultural as a fundamental condition and movement arts as relevant practices to contemporaneity with interdisciplinary framework. dance-tech is conceived as a tactical media project and it aims to develop and maintain a series of online and hybrid collaborative platforms for the interdisciplinary explorers of the performance of movement, innovators and emergent performance practices.

It develops as an experimental, adaptable and changing pedagogical intervention on the knowledge distribution systems of contemporary performance and their contexts. In that sense, it is focused on developing sustainable collaborative strategies and tactics facilitating creative creative synergies of local and global actors on a networked community/world.

It seeks to systematically and flexibly, explore the changing new media landscape and its openness for creative and social innovation.

---

<sup>62</sup> <http://www.dancedigital.org.uk> consulted in September 2011.

Dance-tech combines:

User generated content platforms

Collaborative media production tactics

Online curatorial strategies for movement based practices and new performances

Collaborative and networked strategies for communication and arts mediation.

Mobile technologies

Open knowledge and technologies

It takes into consideration the whole knowledge production ecosystem, exploring networks as a medium for expression, agency, autonomy and empowerment of its members and collaborators.

Dance-tech is curated with a broad and inclusive perspective on life, art and movement practices, offering a wide scope of the creative embodied arts spectrum, from urban performances to well known choreographers in festivals, from the creators to the researchers and theoreticians inside academy, from arts administrators to international collaborations”<sup>63</sup>.

Silke Z./resistdance

"Where other contemporary dance performances struggle with their intellectuality, Silke Z. has created a work which is as complex as it is understandable, a rare performance (...) and the long applause showed that this combination of film and dance is a success"<sup>64</sup>.

“Emotional Energy” is a multimedia dance performance questioning the energy that a movement can leave in the space. By deconstructing a formal dance language, the artists try to texturelize and visualize the energetic base of a movement, which is projected into the space. Dancers’ movements leave traces on the floor of the stage and depending on the relation between the two dancers these images transform. At any time these images can start to have their own lives and function like another dancer in the space<sup>65</sup>.

---

<sup>63</sup> <http://www.dance-tech.net/page/dance-tech-exploring-digital-networks-as-medium> consulted in July 2012.

<sup>64</sup> <http://www.resistdance.de> consulted in July 2012.

<sup>65</sup> [http://gdanskifestiwaltaanca.pl/en/doc\\_167.html](http://gdanskifestiwaltaanca.pl/en/doc_167.html) consulted January 2013.



Figure 23 Emotional Energy by Silke Z

This is a review about Philippe Decouflé's work that goes towards more than one performance I have seen.

Philippe Decouflé “won the Prix Baignolet for choreography when he was just 21, and since then has become one of the most successful showmen in dance – involved in public events, such as the carnival parade celebrating the 200th anniversary of the French Revolution, as well as productions for his own company. Part of his success is due to his versatility, whether turning his hand to old-fashioned physical comedy, pure dance or sci-fi fantasy. As this new retrospective show makes clear, Decouflé operates in the middle of a very unlikely stylistic curve, somewhere between Jacques Tati and Cirque du Soleil. Panorama links together highlights from his repertory from the last 30 years, in a format that's close to music hall. Matthieu Penchinat, with his booming voice and droll incompetency, is master of ceremonies, introducing a fast and freewheeling collage of different routines. In the 1983 Vague Café, we get a joyful but disciplined ragbag of dance styles; in a later solo, Decouflé reverts to an almost Bauhaus severity, restricting the choreography to a rigorous play of spiralling circular forms. There is storytelling by shadow play, an aerial duet and a mock fight to electronic beats. Finally, there's a sampling of more recent work in which shape-shifting costumes, with flipper feet and extra limbs, endow the dancers with a fantastical range of movement.

The performers snap from one turn to the next in exuberant, elegant style, but the drawback with this format is that it's never more than the sum of its routines. There is no overarching narrative or structural dynamic to drive the evening; like spoilt children, we expect each new turn to be funnier, more extraordinary than the last. Like spoilt children, too, we're unreasonably disappointed when it's not”<sup>66</sup>.

---

<sup>66</sup> <http://www.guardian.co.uk/stage/2012/nov/04/philippe-decoufle-company-dca-review> consulted in January 2013.



Figure 24 Piece by Philippe Decoufle "Solo"



Mary Wigman, original name Marie Wiegmann (1886 – 1973) was a German dancer, a pioneer of the modern expressive dance as developed in central Europe. A pupil of Émile Jaques-Dalcroze and Rudolf Laban, she subsequently formulated her own theories of movement, often dancing without music or to percussion only. Although she made her debut as a dancer in 1914, her triumphant career as dancer-innovator-choreographer began after World War I. Her impact on dance throughout central Europe changed the course of dance history. Her pupils, numbering thousands, included Harald Kreutzberg, Yvonne Georgi, Margarethe Wallmann, and Hanya Holm, the latter two exerting major influences on the development of American modern dance. She and her company toured the United States in 1930, and in 1931 a Wigman School was established in New York City under the direction of Holm, which, in 1936, became the Hanya Holm School. Wigman's works include *The Seven Dances of Life* (1918), *Totenmal* (1930), the entire opera *Orpheus and Eurydice* (1947) of Christoph Gluck, other operas, group works, and solos<sup>67</sup>.

Busby Berkeley was one of the greatest choreographers of the US movie musical. He started his career in the US Army in 1918, as a lieutenant in the artillery conducting and directing parades. After the World War I cease-fire he was ordered to stage camp shows for the soldiers. Back in the US he became a stage actor and assistant director in smaller acting troupes. After being forced to take over the direction of the musical "Holka-Polka" he discovered his talent for staging extravagant dance routines, and he quickly became one of Broadway's top dance directors. Producer Florenz Ziegfeld Jr. called him to direct the dance routines for his production of "A Connecticut Yankee in King Arthur's Court". Eddie Cantor, who starred in the long-running Ziegfeld production "Whoopee!", suggested Berkeley create the dance routines in the film version )Whoopee! (1930) and Ziegfeld agreed.

---

<sup>67</sup> <http://www.britannica.com/EBchecked/topic/643417/Mary-Wigman> consulted in June 2012.

At first in Hollywood Berkeley wasn't satisfied with the possibilities of his job--at the time, dance directors trained the dancers and staged the dances. The director chose camera positions and the editor chose which of the takes were shown to the audience. Berkeley wanted to direct the dances himself and convinced producer Samuel Goldwyn to let him try. One of the first chances he took was that he used only one camera in his films. He also showed close-ups of the chorus girls. With the decline of musicals in 1931 and 1932, he was thinking of returning to Broadway when Darryl F. Zanuck, chief producer at Warner Brothers, called him in to direct the musical numbers of Warners' newest project, the backstage drama *42nd Street* (1933). Berkeley accepted and directed great numbers like "Shuffle Off To Buffalo", "Young and Healthy" and the grandiose story of urban life, the finale "42nd Street". The film was a smash hit, and Warner Brothers knew who made it such an extraordinary success—Berkeley. As a director and choreographer he worked on four pictures with teenage stars Judy Garland and Mickey Rooney. He also choreographed the "Fascinatin' Rhythm" finale for MGM's reigning tapping star, Eleanor Powell in *Lady Be Good* (1941). He directed Gene Kelly in his first picture, *For Me and My Gal* (1942). Kelly, who choreographed his own numbers, learned a lot from Berkeley. Berkeley did a few numbers in the early 1950s but, by the end of the decade, he was all but forgotten. A revival of his films in the late 1960s brought him some popularity and he was asked to return to Broadway and supervise the dance direction in the revival of a Vincent Youmans musical comedy from 1925. One of the actresses in this production was Ruby Keeler, one of his leading ladies in Warner musicals. When the production went on tour in 1972, one of the road cast was Eleanor Powell. The production was a smash hit. When he walked on stage after one opening night, the house exploded with applause.

A strange fact is that Busby Berkeley never had a dancing lesson and, in his early days, was very afraid of people finding out. He often drove his producers crazy when he gave orders to build a set and then sat in front of it for a few days, thinking up the numbers<sup>68</sup>.

---

<sup>68</sup> <http://www.imdb.com/name/nm0000923/bio> consulted in November 2011.

Maya Derren made six short films and several incomplete films, including one with Marcel Duchamp titled *Witch's Cradle* (1944). In 1947, Maya Deren became the first filmmaker to receive a Guggenheim grant for creative work in motion pictures. She wrote film theory, distributed her own films, traveled across the USA, and went to Cuba and Canada to promote her films using the lecture-demonstration format to teach film theory, and Voudoun and the interrelationship of magic, science, and religion. Deren established the Creative Film Foundation in the late 1950s to reward the achievements of independent filmmakers.

“[on filmmaking] It would be so much easier to be a painter or a writer. You don't have to have equipment. You don't have to do all the things. You're not at the mercy of the laboratories. You're not here and you're not there. It's a terrible pain to be a filmmaker, because you not only have the creative problems, but you have financial problems that they don't have. You have technical problems that they don't have. You have machines that are breaking down in a way that paintbrushes don't break down. It's just a terrible thing to be a filmmaker. And if you are a filmmaker, it's because there is something in the sheer medium that seems to be able to make some sort of statement that you particularly want to make, and which no other medium to you seems capable of making in the same way”<sup>69</sup>.

As mentioned before, Merce Cunningham developed the choreographic software *Life Forms* in the late eighties that generates movement through a computer, expanding the vision of what the body can do.

For instance in the piece “*Fluid Canvas*” he used a different technology. A reverse process to *Lifeforms*, puts back into digital form human, fishes and horses movement, Cunningham said: “It adds something to our experience in physical terms – we begin to learn about the operation of the body”<sup>70</sup>.

It is very interesting that animal movement together with human movement had been an inspiration for Cunningham due to its difference from human anatomy parameters.

---

<sup>69</sup> <http://www.imdb.com/name/nm0220305/bio> consulted in march 2012.

<sup>70</sup> <http://londondance.com/articles/features/merce-cunningham-and-lifeforms> consulted in may 2013.

Cunningham also used in his work Motion Capture Animation with animation by Paul Kaiser, Shelley Eshkar and Marc Downie who are worldwide experts. The way it works is that a special camera captures movement from any living source and records only the trail of some reflective points on their bodies. Afterwards this map is used as data in order to animate a virtual image or persona. For both 'Fluid Canvas', and also for their own installation, Loops where they captured Cunningham dancing with his hands. They tracked 21 points on each hand and ended up producing an abstract digital portrait.

The piece "Biped" is a good example where Eshkar and Kaiser represented captured motion devising a 3D amount of curves and lines giving it a look of a sketch or a wire sculpture. They went a step further in their creation by working with Downie, a master in Artificial Intelligence who contributed for the project by generating automatically the drawings on the computer by using intelligence deep into the system. Programmed by algorithms the system decides how to represent the movement data that was fed.



Figure 25 Biped, Merce Cunningham, example of Motion Capture Animation

Rui Horta is a Portuguese choreographer. In August 2000 he returned to Portugal (Montemor-o-Novo), where he established a multi disciplinary research and residence center O Espaço do Tempo, in a old monestery of the 16th century – today one of the most important production centres in Portugal.

In 2001 he directed his first movie “RUGAS”, and was rewarded for his latest production “PIXEL” the Acarte award, prize for the best production of that year. In

2002 he created “LP” for his own company and in 2003 he has staged the new production of the French nouvelle cirque company “Les Arts Sauts”<sup>71</sup>.

In the performance world his directing work spans from theatre to opera and experimental music as well as light designer and multimedia researcher which is an universe he uses frequently in his pieces<sup>72</sup>.

Isabel Valverde is a performer, interdisciplinary choreographer and researcher originally from Portugal. Isabel has recently completed her Ph.D. in Dance History and Theory from U.C. Riverside. Her dissertation is titled "Interfacing Dance and Technology: a theoretical framework for performance in the digital domain." She is currently a post-doctoral fellow of the E.U./Fundação para a Ciência e a Tecnologia (Portugal) pursuing her research at U.C. Irvine, Nottingham Trent U., and U. de Paris 8.

Developing her experimental choreography in solo and collaborative work since 1986, Isabel performed in Portugal, Amsterdam, San Francisco, and Los Angeles. Since 2002 she has been developing My Fado Dance: What Portugueseness, a work-in-progress solo using Portuguese Fado music, and video, around Los Angeles. Towards the familiarization with new embodiments and human interactions as well as the continuum of actualization and virtualization, Most recently, IN TOUCH, a mixed reality environment based on costumed made touch sensor wearables, with V. Zordan, K. Chi, V. Sundar, P. Chagas, (first prototype performed at Siggraph 2005 - Cyberfashion Show, Los Angeles). As curator and producer she initiated the Evenings of Video Dance, a periodical show of 'live' and dance for the camera work at Artists' Television Access, San Francisco (1999-2001). She is a member of the Society of Dance History Scholars. “Senses Places” is a dance-technology collaborative project creating a playful mixed reality performance environment for audience participation. Generating whole body multimodal interfacings keen to a somatic cross-cultural approach, the project stresses an

---

<sup>71</sup> [http://www.oespacodotempo.pt/en/esp\\_tem.php?idpan=rui\\_bio](http://www.oespacodotempo.pt/en/esp_tem.php?idpan=rui_bio) consulted November 2013

<sup>72</sup> [http://www.musica.gulbenkian.pt/cgi-bin/wnp\\_db\\_dynamic\\_record.pl?dn=db\\_musica\\_bios\\_pt&sn=musica&orn=159](http://www.musica.gulbenkian.pt/cgi-bin/wnp_db_dynamic_record.pl?dn=db_musica_bios_pt&sn=musica&orn=159) consulted in November 2013.

integration of simultaneous local and remote connections, where participants and environments meet towards a kinesthetic/synesthetic engagement.

Grounded by a shared score and Second Life© Sim, performer-facilitators initiate the performance at the conference in China and at another node in Japan, soon tuning the audience members to several modes of physical-virtual body-body and body-environment interactions. Re-purposing the Web 2.0 and recent game devices with a synergetic/semantic approach to interface design, the interfaces include, video and avatar mediations via webcam, Wiimote©, and Kinect©, plus a biometric device.

Through an inclusive process engaging kinesthetic empathy, Senses Places deepens contemporary dance practices, such as, Contact Improvisation and Butoh, weaving Eastern-Western somatic based on ancient and contemporary Tai Chi, Yôga, BodyMind Centering, Release, and Alexander Techniques. The improvisation evolves in a sharing of corporealized places, times, and energies, encouraging a fuller experience of the moment.

Emerging embodiments, realities, and cultures are generated by the multiparticipant playful involvement as the participants follow, act upon, and respond to their own and each other's physical bodies, video mediations, avatar moves, and/or environmental changes. Climate related body-environment activity is affected through the wireless communication, linking biometric inputs and environmental device actuators, such as, temperature-light/color, breathing-smoke/wind modulations.

Senses Places wishes to contribute to enlarge the range and interconnectedness of sensory-perceptions within the already complex practice of the inter-subjective and group improvisation, proposing a constructive and transformative means of socialization, reversing the dead end substitution, gender and movement cultural stereotypification, and instrumentalization of bodies by avatars in social networks, such as Second Life<sup>73</sup>.

---

<sup>73</sup> <http://www.digitalcultures.org/Symp/Isabel.htm> consulted in February 2013

Blast Theory is a UK based renowned internationally as one of the most adventurous artist's groups using interactive media, creating groundbreaking new forms of performance and interactive art that mixes audiences across the internet, live performance and digital broadcasting. Led by Matt Adams, Ju Row Farr and Nick tandavanitj, their work explores the social and political aspects of technology. The work quite often is on the border of the real and fictional. "A Machine To See With" is a Locative Cinema commission from the Sundance Film Festival, 01 San Jose Biennial and the Banff New Media Institute. It is a film where the audience plays the lead. A person signs up online and hands over their mobile phone number. On the day, one receives an automated call giving the address needed to go to. Once one arrives on the allotted street corner the phone rings. From there a series of instructions leads the person through the city. The member of the audience is the lead in a heist movie; it's all about them. As one moves from hiding money inside a public lavatory, to meeting up with a partner in crime and onwards to the bank, the tension rises. It's up to them to deal with the bank robbery and it's aftermath<sup>74</sup>.



Figure 26 "A Machine To See With" by Blast Theory

---

<sup>74</sup> <http://www.blasttheory.co.uk/our-history-approach/> consulted in November 2011.



Forced Entertainment is a UK based group of six artists. They started working together in 1984 and in the many projects we've created tried to explore what theatre and performance can mean in contemporary life. In doing so they have made lists, played games, spoken gibberish, stayed silent, made a mess, dressed up, stripped down, confessed to it all, performed magic tricks, told jokes, clowned around, played dead, got drunk, told stories and performed for six, twelve and even 24 hours at a stretch. The work they make is always a kind of conversation or negotiation. They are interested in making performances that excite, frustrate, challenge, question, entertain and in confusion as well as laughter. It's seriously playful work and trying to answer questions about theatre and performance – about what those things might be for themselves and what kinds of dialogue they can open with contemporary audiences. As well as performance works, Forced Entertainment made gallery installations, site-specific pieces, books, photographic collaborations, videos and even a mischievous guided bus tour.

Forced Entertainment have created interactive cd-roms in collaboration with the photographer Hugo Glendinning and Director, Tim Etchells has worked with SMS messaging in a week long performance project. The piece "A Machine To See With" is a film where the viewer plays the lead. One signs up online and hands over their mobile phone number. On the day, an automated call is received providing the address where to go to. On arrival at the allotted street corner the viewer's phone rings. From there a series of instructions lead one through the city<sup>75</sup>.

BADco. "is a collaborative performance collective based in Zagreb, Croatia. The artistic core of the collective are Ivana Ivković, Ana Kreitmeyer, Tomislav Medak, Goran Sergej Pristaš, Nikolina Pristaš, Lovro Rumiha and Zrinka Užbinec. As a combination of four choreographers / dancers, two dramaturgs and one philosopher, plus the company production manager, since its beginning (2000), BADco. systematically focuses on the research of protocols of performing, presenting and observing by structuring its projects around diverse formal and perceptual relations

---

<sup>75</sup> <http://www.forcedentertainment.com/page/3009/About-Us> consulted in November 2011

and contexts. Reconfiguring established relations between performance and audience, challenging perspectival givens and architectonics of performance, problematizing of communicational structures – all of that makes BADco. an internationally significant artistic phenomenon and one of the most differentiated performance experiences.”<sup>76</sup>

It is happening right now in 2014, it is actual and is doing an incredible job in using computer technology to promote creation of choreography without the technology then being shown on stage; therefore it’s a creative tool. I was introduced to it and did a workshop in the Bournemouth (UK) conference Digital Futures in Dance in September 2011.

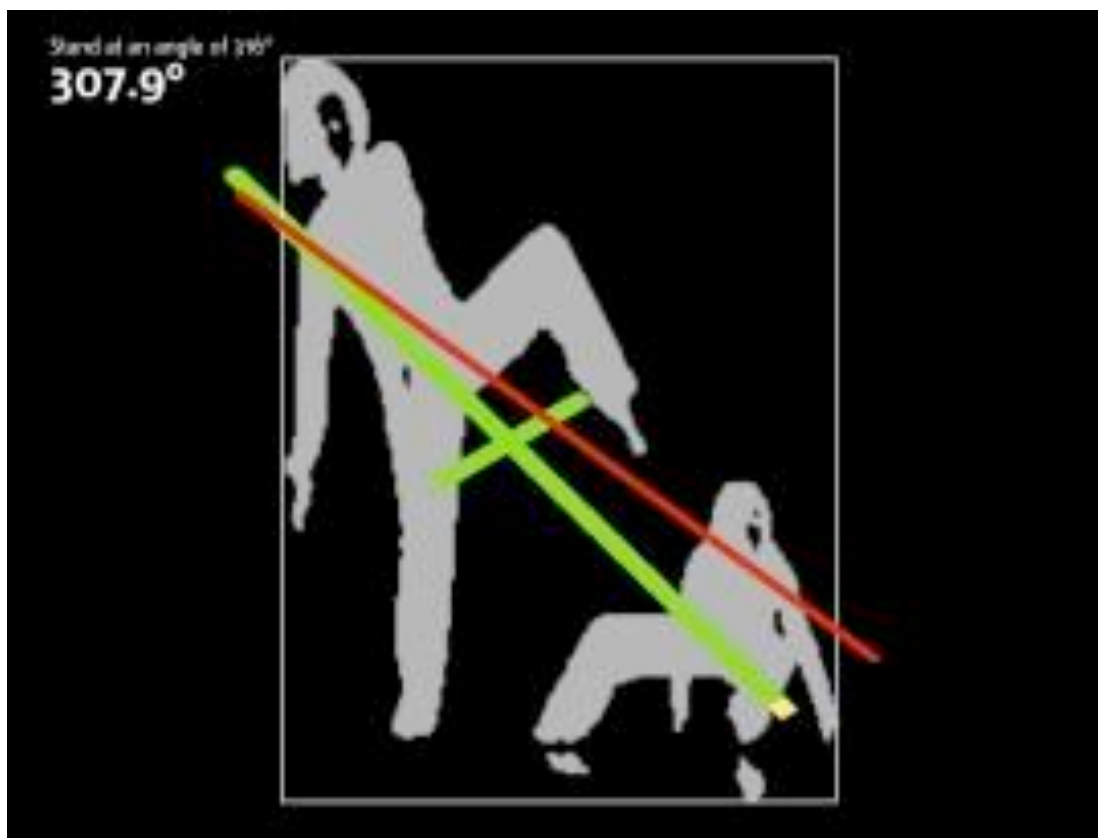


Figure 27 Whatever Dance Toolbox by BADco.

---

<sup>76</sup> <http://badco.hr/badco/> consulted in October 2011.

“Whatever Dance Toolbox is a set of software tools designed for the analysis and development of dance and movement. Six tools included in the suite can help dancers and choreographers devise, develop and rehearse dance, but can also be used in dance education or by non-dancers to explore movement. The suite is a product of a long-standing collaboration between BADco. and German humanmachine interface developer and artist Daniel Turing, and it reflects some of the mutual concerns with the dancer-computer interaction and choreographic thinking.



Figure 28 Whatever Dance Toolbox in Action

Using Whatever Dance Toolbox in rehearsal dancers can manipulate the image of movement and work with an “active mirror” to produce qualities that they cannot produce on their own. Body is placed inside a different relation to its environment, which, in turn, determines and changes its expressiveness. Tools employ visual analysis, tasks and temporally manipulated reproduction of captured images to allow dancers and choreographers to study and complexify their movement and composition. The machine-factor generates an organization of choreographic

elements different and alien to what other choreographic methodologies can produce.

Free download and easy setup

Whatever Dance Toolbox comes on a free Ubuntu GNU/Linux LiveCD that you can insert into your computer's CD/DVD drive and boot into the operating system without having to install it on your computer's hard drive. All you will need to start working on Whatever Dance Toolbox is a computer with a CD/DVD drive connected by a FireWire cable to a video camera and, preferably, a video projector or a large screen.

Detailed introduction and instructions can be found in the Whatever Dance Toolbox – Manual. The electronic version of the Manual can be downloaded from the internet.

Note that the electronic version of the Manual does not include methodological exercises that BADco. has developed and that can be used to develop your own work. As the tool is intuitive, you can develop your own exercises, but should you wish to benefit from BADco. experience you can order the Manual as a book.

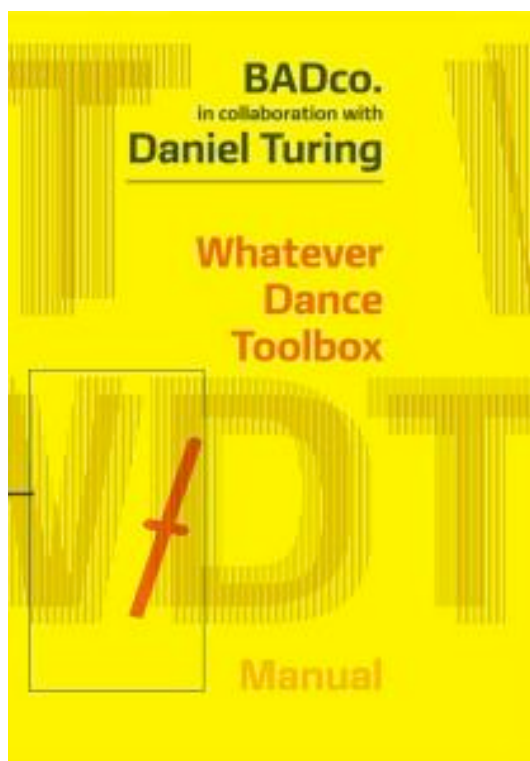


Figure 129 Whatever Dance Toolbox Manual

Based on the experience of using Whatever Dance Toolbox in their own work and facilitating numerous workshops with the tool, they have developed a set of exercises that can help people in their work. Whatever Dance Toolbox – Workshops”<sup>77</sup>

### **2.2.2 Artists**

Klaus Obermeyer is a media artist, director, choreographer and composer based in Vienna, Austria. Since more than two decades media-artist, director/choreographer and composer Klaus Obermaier creates innovative works in the area of performing arts, music, theatre and new media, highly acclaimed by critics and audience. Apparition, 2004, Interactive Dance is a good example of his work<sup>78</sup>

---

<sup>77</sup> <http://badco.hr/works/whatever-toolbox/> consulted in October 2011.

<sup>78</sup> [www.exile.at](http://www.exile.at) consulted in February 2013





Figure 30 Apparition by Klaus Obermeyer.

Claudia Robles was born in Bogotá (Colombia). Currently, she lives in Cologne (Germany). She finished studies in Fine Arts in 1990 at the University J. T. Lozano in Bogotá (Colombia). She pursued postgraduate studies such as: Film Animation (1992-1993) at the CFP (Milan-Italy); MA in Visual Arts (1993-1995) at the École Supérieure d'Art Visuel (Geneva-Switzerland) and Sound Design and Electronic Composition at the Folkwang University Essen (Germany) from 2001 to 2003. She was artist in residence (2004-2006) at the ZKM Centre for Media Art in Karlsruhe (Germany). Her most relevant work presented there was the piece Seed/Tree (audiovisual Installation/Butoh performance with live-electronics). Her work is known worldwide, having participated in several group and solo exhibitions around the globe, for example at the Bauhaus-archiv Museum fuer Gestaltung in Berlin, Germany (2003); the European Capitals of Culture: Sibiu and Luxemburg (2007); Enter3 in Prague, Czech Republic (2007); the International Computer Music Conference ICMC in Copenhagen, Denmark (2007) and Montréal, Canada (2009); at the SIGGRAPH Asia 2009 in Yokohama, Japan (2009) and lately at the DRHA 2010, Brunel University in London, UK.<sup>79</sup>



Figure 31 INsideOUT by Claudia Robles at the University of Miami's CAS Art Gallery (USA).

---

<sup>79</sup> <http://people.brunel.ac.uk/bst/vol1001/claudiarobles/> consulted in December 2013.



David Hinton is a film director who has made many documentaries for British television. His subjects have included artists of all kinds, including painter Francis Bacon, film-maker Bernardo Bertolucci, writer Alan Bennett, and choreographer Karole Armitage. He has also made films about Dostoyevsky, rock and roll, visual comedy, and the Cultural Revolution in China. He is best known in the dance world for *DEAD DREAMS OF MONOCHROME MEN* and *STRANGE FISH*, his film versions of stage shows by DV8 Physical Theatre. He has also made performance films with Adventures in Motion Pictures, the Alvin Ailey Company and the Royal Swedish Ballet, and he has collaborated with several choreographers to create original dance works for the screen. He has twice won British Academy awards for his documentaries, and his dance films have won many awards, including a Prix Italia, an Emmy, and the IMZ Dance Screen Award.<sup>80</sup>

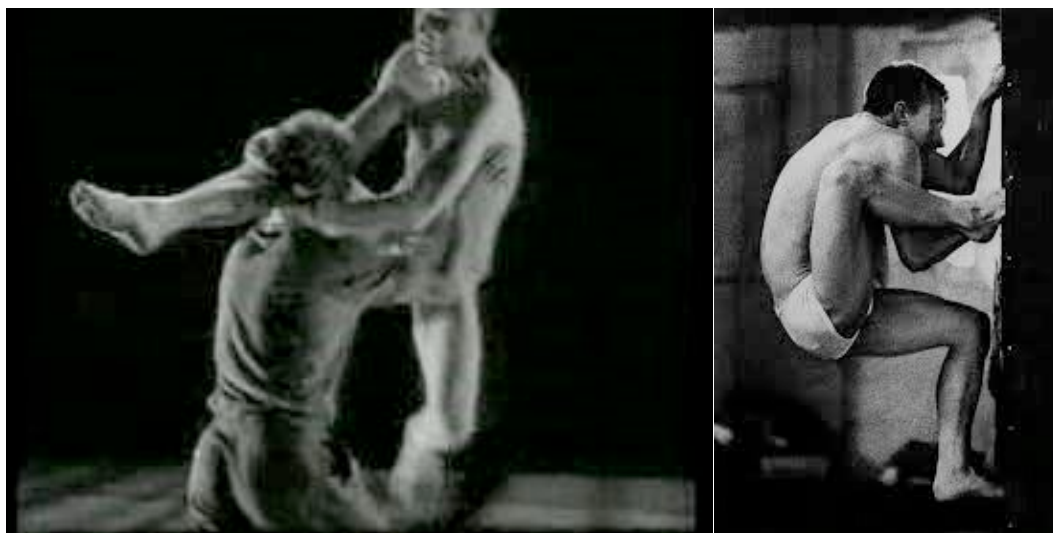


Figure 32 *Dead Dreams of Monochrome Men* by David Hinton, a Dance Film version of DV8 choreography

---

<sup>80</sup> <http://www.dancefilms.org/event/meet-the-artist-david-hinton/> consulted in March 2012.

Meredith Monk is a composer, singer, director/choreographer and creator of new opera, music-theater works, films and installations. A pioneer in what is now called “extended vocal technique” and “interdisciplinary performance,” Monk creates works that thrive at the intersection of music and movement, image and object, light and sound in an effort to discover and weave together new modes of perception. Her groundbreaking exploration of the voice as an instrument, as an eloquent language in and of itself, expands the boundaries of musical composition, creating landscapes of sound that unearth feelings, energies, and memories for which there are no words. Over the last five decades, she has been hailed as “a magician of the voice” and “one of America’s coolest composers”. A pioneer in sitespecific performance, award-winning film maker, her music can also be heard in films and in addition to her numerous vocal pieces, music-theater works and operas, Monk has created vital new repertoire for orchestra, chamber ensembles, and solo instruments<sup>81</sup>.

Johannes Birringer joined Brunel University's School of Arts in early 2006. He is director of the DAP-Lab and Acting Director of the newly created Centre for Contemporary and Digital Performance. He is a choreographer and media artist, and artistic director of AlienNation Co., a Houston-based multimedia ensemble that has collaborated on numerous site-specific and cross-cultural performance and installation projects since 1993. After directing international workshops on dance and technology in England, Germany, and the U.S., he was appointed head of the new dance and technology program at The Ohio State University (1999-2003) where he developed the new MFA curriculum in dance technologies and conducted research programs in his "Environments Lab." In 2003 he was appointed Principal Research Fellow in Live Art and Performance at Nottingham Trent University. In late 2005 he convened the Digital Cultures Lab, a crosscultural dance and technology workshop-festiva, and in 2003 he founded the Interaktionslabor Goettelborn in a former Coal Mine in the Saarland, Germany. The Interaktionslabor is an annual international workshop dedicated to research, performance and software application development in interactive and networked media technologies.

---

<sup>81</sup> <http://www.meredithmonk.org/about/bio.html> consulted in March 2012.

His exhibition-performances and digital films have been staged in Europe, the U.S., Latin America, China and Japan. He has received numerous arts grants, awards, and fellowships for his work including a NEA/Rockefeller artists project grant in 1993. More recently, his directing projects included multi-media play *Sueno*, the interactive dance work *Suna no Onna* (London 2007-08), the digital oratorio *Corpo, Carne e Espirito* (Brasil 2008), and *UKIYO [Moveable Worlds]* (2009-2010), a choreographic installation created with artists from DAP-Lab and Tokyo/Japan<sup>82</sup>.

Garry Hill is an American video and installation artist. His early work was sculptural, but in the early 1970s he turned to audio and video, experimenting with imaging equipment and digital processing to create visual effects analogous to the appearance of abstract paintings. His sculptural background continued to play a part in his video installations; for his earliest video installation, *Hole in the Wall* (1974), he broke a hole through a wall of the Woodstock Artists' Association, placing on the other side a monitor that replayed his destructive action. In the late 1970s he became interested in the possibilities of combining images, sound and language. His work often makes specific literary references; *Incidence of Catastrophe* (1987–8), a colour video with stereo sound lasting just over 18 minutes, was directly inspired by Maurice Blanchot's existential novel *Thomas l'obscur*. Here Hill appears as a free interpretation of the character Thomas, naked, engulfed and eventually overcome by language. In *Between Cinema and a Hard Place* (1991; Seattle, Donald Young Gal.), a three-channel video installation with 23 modified video monitors and computer-controlled video switches, Hill used a passage from Heidegger's *Unterwegs zur Sprache*, metaphorically describing the relation between poetry and thinking; the many monitors, stripped of their casing, display images that roll across the screens and flicker on and off, interacting in a variety of ways with the rhythm and meaning of the spoken words<sup>83</sup>.

---

<sup>82</sup> <http://www.brunel.ac.uk/arts/theatre/staff/johannes-birringer> consulted in July 2011.

<sup>83</sup> <http://www.tate.org.uk/art/artists/gary-hill-2376> consulted in December 2013.

Bruce Nauman born 1941, is an American sculptor noted also for his environments, films and videotapes. Stopped painting in 1965 and began to make objects, performance pieces and films. First one-man exhibition, of fibreglass sculptures, at the Nicholas Wilder Gallery, Los Angeles, 1966. Moved in 1966 to San Francisco. Made sculptures based on the backs of objects or moulded from parts of his own body; also works concerned with the notion of hiddenness or inaccessibility, and neon pieces with words (sometimes more or less illegible). Since 1968 his work has consisted mainly of performance pieces, e.g. films of such actions as Bouncing Two Balls between the Floor and the Ceiling with Changing Rhythms, or corridors and installations involving a limited degree of spectator participation and exploring effects of parallax, audio-tactile separation, disorientation, etc<sup>84</sup>.

---

<sup>84</sup> <http://www.tate.org.uk/art/artists/bruce-nauman-1691> consulted in November 2013.



Figure 33 Video Installation “Corridor” by Bruce Nauman

Bill Viola is an American video and sound installation artist. Viola was involved with video and electronic media while a student at Syracuse University, New York, in the early 1970s. His concentration on audio as well as visual mediation was influenced at this time by study with the composer David Tudor and the Composers Inside Electronic Group. His subsequent work was marked both by his use of innovative

technology and by culturally diverse sources garnered from travels to the South Pacific and later to the Himalaya. In *He Weeps for You* (1976; Berlin, Neue N.G.), an installation shown at Documenta 6 in Kassel, Viola used a closedcircuit television to include the viewer's image, reflected in a water droplet, in a cycle of filming and projection that evinces the influence of Eastern philosophy through the use of new technology, creating an unaffected allegorical representation of human experience. Viola's approach became broader and less dependent on technological intervention in the early 1990s. *Heaven and Earth* shows two videos taken of a woman dying and another woman giving birth, the screens positioned so close that they reflect in one another. Viola's entry for the 46th Venice Biennale continued this more broadly signifying approach: of a set of five works collectively titled *Buried Secrets*, the last, *The Greeting* (1995; Basle, Kstmus.), showed a slowed-down staged film of three women meeting. With references to Renaissance painting, the minutely observed, coagulated moment becomes emblematic of a broader time-span of human experience<sup>85</sup>.

---

<sup>85</sup> <http://www.tate.org.uk/art/artists/bill-viola-2333> consulted December 2013.



Figure 34 Video Installation by Bill Viola "Heaven and Earth"

While groups like Blast Theory are exploring and integrating interactive media in the present (now), Choreographer Merce Cunningham, in collaboration with Charles Atlas, was experimenting with the idea of fragmenting of dance images amongst various screens in 1977. They created the piece “Fragments” (Vaughan 152) in that year, - an original choreography made for video which was later reworked for stage – when usually the order of this process would be the opposite. As far back as 1969/1970, Meredith Monk stated she was interested in creating a ‘live movie’. What she did was to appropriate the cinematic properties of film and apply them to a live performance. “...creating a live movie and a work that addressed her fascination with cinematic time and space”<sup>86</sup>.

For instance in the piece “(h)interland” by Shobana Jeyasingh Dance Company, video was used in various ways: from a live web cast from India, a digitally enhanced video, in order to achieve a startling and surreal disorientation of the architecture of theatrical dance. In the space there was several flat screens, one showing the web cast, another a short video with vocals, and another screen became a trompe d’oeil when the dancers broke through it. The result of this was a dialogue between three different space and time realities. Video in this case was being used to promote a conversation between architectural spaces inside the theatre and outside (India). Nevertheless, the dancer moves inside of a frame or in front of it <sup>87</sup>. This got me thinking that if the video was to be projected onto a dancer, that would stop the dancer from moving otherwise the video could not be seen. The required stillness of the dancer defeats its purpose. If the dancer moves we cannot see the film, and if the film is on, then the dancer needs to be in stillness. With regards to having video projected in dance performance I soon realised that this need for a still surface on which to project the film was reducing the possibilities for exploring interactions between dance and video that promoted movement, not stillness.

---

<sup>86</sup> [http:// www.dvpg.net/docs/videospace.pdf](http://www.dvpg.net/docs/videospace.pdf) consulted in May 2012.

<sup>87</sup> <http://www.shobanajeyasingh.co.uk> consulted in November 2012.



Nina Kov is a French-born choreographer who's been awarded the Associate Artist scheme from DanceDigital for 2010- 2011, with the artists' collective Hellicar & Lewis. Nina' primary interest is to explore the possibilities of expression of the unconscious within the frame of dance-based live digital performances. She uses the body as a meeting platform between technology and self-expression. Alongside transmitting personal and emotional experiences to the body, her work creates cinematic dreamscapes which enlighten the fragility of human emotions. Nina is also interested in Motion Capture and collaborates with Goldsmith University to create a choreographic interactive installation.

For instance looking at the piece "Divide by Zero" one can observe the use of interactive projection technology. This piece is a kinesthetic and visual journey into the unconscious of a dancer, Catarina Carvalho. The viewer is invited to a ritual recreation of one's self and psychological space, an 'Autopoiesis' where the interpenetration of body and virtual images makes visible the emotions and sensations in the the flesh. The organic yet refined aesthetics of the piece, influenced by Japanese minimalism, builds a set of lights and shadows created by the movements of the dancer. The smallest gestures are picked up and magnified, making possible the poetic coexistence of the intimate and the spectacular. In this infinite inner space, the body is the platform between unconscious and virtual<sup>88</sup>.

---

<sup>88</sup> <http://www.ninakov.com/> consulted January 2013.

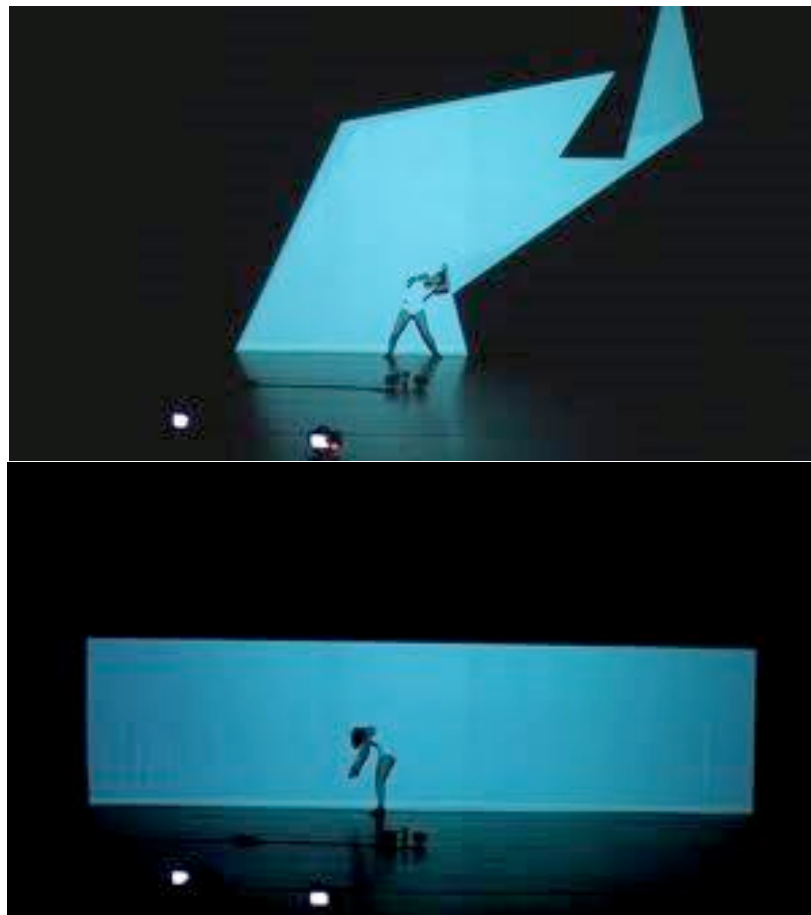


Figure 35 Piece “Divide by Zero” by Nina Kov

Thierry De Mey is a composer and filmmaker from Belgium. An instinctive feel for movement guides his entire work, allowing him to tackle and integrate a variety of disciplines. The premise behind his musical and filmic writing is the desire for rhythm to be experienced in the body or bodies, revealing the musical meaning for the author, performer and audience. He has developed a system of musical writing for movement used in pieces where the visual and choreographic aspects are just as important as the gesture producing the sound, such as in *Musique de tables* (1987), *Silence must be!* (2002) and *Light Music*, which premiered at Lyon’s *Musiques en Scène* biennial festival in 2004.

A large part of his music production is intended for dance and cinema. He has often been more than a composer for the choreographers Anne Teresa De Keersmaeker, Wim Vandekeybus and his sister Michèle Anne De Mey. Among his main work one can mention *Rosas danst Rosas*, *Amor constante*, *April me*, *Kinok* (choreographies by A. T. De Keersmaeker), *What the body does not remember*, *Les porteuses de*

mauvaises nouvelles, Le poids de la main (choreographies by W. Vandekeybus), Dantons Töd (dir. Bob Wilson), Musique de table, Frisking for percussion, a string quartet, Counter Phrases, amongst others.<sup>89</sup>.



Figure 36 Musique de tables by Thierry De Mey

---

<sup>89</sup> [http://www.compositeurs.be/en/compositeurs/thierry\\_de\\_mey/47/](http://www.compositeurs.be/en/compositeurs/thierry_de_mey/47/) consulted in April 2012

Rosas is the dance ensemble and production structure built around the choreographer and dancer Anne Teresa De Keersmaeker. She immediately attracted the attention of the international dance scene with her 1982 debut *Fase*, four movements to the music of Steve Reich. Over the last 27 years, she has, with her dance company, created an impressive series of choreographic works. Rosas' dance is pure writing with movement in time and space. At its heart lies the relationship between movement and music. In some productions, the relationship between dance and text is also examined.

Some of her early works in dance Film are *Rain* 2012 – *Counterphrases* 2003 – *40 portraits* 2002 – *Corps Accords* 2002 – *Fase, Four Movements to the Music of Steve Reich* 2002 – *Vocabulary* 2002 – *Small hands* 2001 – *Rosas Danst Rosas* 1997 – *Tippeke* 1996 – *Achterland* 1994 – *Mozart / Materiaal* 1993 – *Rosa* 1992 – *Ottone / Ottone I and II* 1991 – *Hoppla!* 1990 – *Monoloog van Fumiyo Ikeda op het einde van Ottone, Ottone* 1989<sup>90</sup>.

---

<sup>90</sup> <http://www.rosas.be/en/rosas> consulted in April 2012.



Figure 37 Rosas danst Rosas filmed by Thierry De Mey

Jackson Pollock (1912-1956) was an American painter, the chief pioneer of Abstract Expressionism. Born in Cody, Wyoming, and grew up in Arizona and California.

Moved to New York and studied 1929-31 with Thomas Benton at the Art Students League. Influenced by Benton's regionalist style and by Ryder, and later by the Mexican mural painters and Picasso. Worked as an easel painter on the WPA Federal Art Project 1938-42. Paintings of ritual violence or sexuality, with turbulent clashes of movement and fragmentary archetypal imagery, which led gradually in the early 1940s to a completely abstract 'all-over' style to which was given the name Abstract Expressionism. First one-man exhibition at Peggy Guggenheim's gallery Art of This Century, New York, 1943. His involvement with gestural painting, inspired partly by the sand painting of the American Indians and partly by Surrealism, culminated in his use from 1947 of a technique of dripping trails of paint onto a canvas laid flat on the floor. Married the painter Lee Krasner in 1944 and settled with her at Springs, Long Island, 1946. Painted a number of works in black and white in 1951-2, many with re-emerging imagery of anatomical motifs, etc.<sup>91</sup>



Figure 38 Jackson Pollock working with his unique upright position and painting on a floor surface

Willem de Kooning (1904 – 1997) was an American Abstract Expressionist painter and sculptor. Born in Rotterdam. Apprenticed at the age of twelve to a firm of commercial artists and decorators; also studied for eight years at evening classes at Rotterdam Academy of Fine Arts and Techniques. Emigrated to the USA in 1926.

---

<sup>91</sup> <http://www.tate.org.uk/art/artists/jackson-pollock-1785> consulted in March 2012

Supported himself at first by painting signs, department-store displays, carpentry, etc.; only decided to be primarily a painter after a year on the WPA Federal Art Project 1935. Friendship with John Graham and Gorky. In the 1930s and early 1940s painted abstractions and figures; worked c.1945-9 mainly in black and white with high velocity, erotic shapes. His first one-man exhibition at the Egan Gallery, New York, in 1948 established his reputation. Taught at Black Mountain College, North Carolina, 1948 and at Yale Art School 1950-1. Painted a series of 'Women' c.1950-5, followed by pictures related to impressions of landscape. Moved in 1963 from New York to The Springs, Long Island. Since 1969 has also made a number of sculptures<sup>92</sup>.

Arshile Gorky, original name Vosdanik Adoian (1904 – 1948) was an American painter, important as the direct link between the European Surrealist painters and the painters of the American Abstract Expressionist movement. Early in his career, he hit on the idea of becoming a great painter by subjecting himself to long apprenticeships, painting in the style of such artists as Paul Cézanne, Joan Miró, and Pablo Picasso. His aim was never merely to imitate the work of others, however, but to assimilate fully their aesthetic vision and then move beyond it. The Surrealists' idea that art is the expression of the artist's unconscious enabled Gorky to discover his personal idiom, which he pursued the last eight years of his life. In such works as *The Liver Is the Cock's Comb* (1944) and *How My Mother's Embroidered Apron Unfolds in My Life* (1944), biomorphic forms that suggest plants or human viscera float over an indeterminate background of melting colours. The erotic significance of the loosely painted forms and elegant, fine black lines is often made explicit in such titles as *The Diary of a Seducer* (1945) and *The Betrothal II* (1947). The years that saw Gorky finally emerge as one of the most important painters in the United States were marked by personal tragedy, however. In early 1946 he lost many of his paintings in a studio fire, followed by several accidents that culminated in suicide<sup>93</sup>.

---

<sup>92</sup> <http://www.tate.org.uk/art/artists/willem-de-kooning-1433> consulted in March 2012.

<sup>93</sup> <http://www.britannica.com/EBchecked/topic/239341/Arshile-Gorky> consulted in March 2012.

<sup>58</sup><http://sugurugoto.blogspot.pt/2012/05/cymatics-by-suguru-goto.html> consulted in November 2012.

Suguru Goto is a composer/performer, an inventor and a multimedia artist and he is considered one of the most innovative and the mouthpiece of a new generation of Japanese artists. He is highly connected to technical experimentation in the artistic field and to the extension of the existing potentialities in the relation man-machine. In his works the new technologies mix up in interactive installations and experimental performances; he is the one who invented the so called virtual music instruments, able to create an interface for the communication between human movements and the computer, where sound and video image are controlled by virtual music instruments in real-time through computers. Lately, he has been creating the robots, which perform acoustic instruments, and he is gradually constructing a robot orchestra.<sup>58</sup>

Stelarc is a performance artist who has visually probed and acoustically amplified his body. He has made three films of the inside of his body. Between 1976-1988 he completed 25 body suspension performances with hooks into the skin. He has used medical instruments, prosthetics, robotics, Virtual Reality systems, the Internet and biotechnology to explore alternate, intimate and involuntary interfaces with the body.

He has performed with a THIRD HAND, a VIRTUAL ARM, a STOMACH SCULPTURE and EXOSKELETON, a 6-legged walking robot. His FRACTAL FLESH, PING BODY and PARASITE performances explored involuntary, remote and internet choreography of the body with electrical stimulation of the muscles. His PROSTHETIC HEAD is an embodied conversational agent that speaks to the person who interrogates it. He is surgically constructing an EXTRA EAR on his arm that will be internet enabled, making it a publicly accessible acoustical organ for people in other places. He is presently performing as his avatar from his SECOND LIFE site.

In 1995 Stelarc received a three year Fellowship from The Visual Arts/Craft Board, The Australia Council and in 2004 was awarded a two year New Media Arts Fellowship. In 1997 he was appointed Honorary Professor of Art and Robotics at Carnegie Mellon University, Pittsburgh. He was Artist-In-Residence for Hamburg



City in 1997. In 2000 he was awarded an Honorary Degree of Laws by Monash University. He has completed Visiting Artist positions in Art and Technology, at the Faculty of Art and Design at Ohio State University in Columbus in 2002, 2003 & 2004. He has been Principal Research Fellow in the Performance Arts Digital Research Unit and a Visiting Professor at The Nottingham Trent University, UK. Between 2006 and 2011 he was Senior Research Fellow and Visiting Artist at the MARCS Lab, University of Western Sydney, Australia. He is currently Chair in Performance Art, School of Arts, Brunel University, Uxbridge, UK. In 2010 he has received a special projects grant from the Australia Council and was also awarded the Ars Electronica Hybrid Arts Prize. In 2012 he was the recipient of the Michael Cook Performance and Body Artist Award. Stelarc's artwork is represented by the SCOTT LIVESEY GALLERIES in Melbourne.<sup>94</sup>

William Forsythe : As found on the company's website Forsythe is recognized as one of the world's foremost choreographers. His work is acknowledged for reorienting the practice of ballet from its identification with classical repertoire to a dynamic 21st century art form. Forsythes deep interest in the fundamental principles of organisation has led him to produce a wide range of projects including Installations, Films, and Web based knowledge creation.

This is the bio taken from the website :

Raised in New York and initially trained in Florida with Nolan Dingman and Christa Long, Forsythe danced with the Joffrey Ballet and later the Stuttgart Ballet, where he was appointed Resident Choreographer in 1976. Over the next seven years, he created new works for the Stuttgart ensemble and ballet companies in Munich, The Hague, London, Basel, Berlin, Frankfurt am Main, Paris, New York, and San Francisco. In 1984, he began a 20-year tenure as director of the Ballet Frankfurt, where he created works such as Artifact (1984), Impressing the Czar (1988), Limb's Theorem (1990), The Loss of Small Detail (1991, in collaboration with composer Thom Willems and designer Issey Miyake), A L I E / N A(C)TION (1992), Eidos:Telos

---

<sup>94</sup> <http://stelarc.org/?catID=20239> consulted in November 2013

(1995), *Endless House* (1999), *Kammer/Kammer* (2000), and *Decreation* (2003). After the closure of the Ballet Frankfurt in 2004, Forsythe established a new, more independent ensemble. The Forsythe Company, founded with the support of the states of Saxony and Hesse, the cities of Dresden and Frankfurt am Main, and private sponsors, is based in Dresden and Frankfurt am Main and maintains an extensive international touring schedule. Works produced by the new ensemble include *Three Atmospheric Studies* (2005), *You made me a monster* (2005), *Human Writes* (2005), *Heterotopia* (2006), *The Defenders* (2007), *Yes we can't* (2008/2010), *I don't believe in outer space* (2008), *The Returns* (2009) and *Sider* (2011). Forsythe's most recent works are developed and performed exclusively by The Forsythe Company, while his earlier pieces are prominently featured in the repertoire of virtually every major ballet company in the world, including The Kirov Ballet, The New York City Ballet, The San Francisco Ballet, The National Ballet of Canada, England's Royal Ballet, and The Paris Opera Ballet. Awards received by Forsythe and his ensembles include the New York Dance and Performance "Bessie" Award (1988, 1998, 2004, 2007) and London's Laurence Olivier Award (1992, 1999, 2009). Forsythe has been conveyed the title of Chevalier des Arts et Lettres (1999) by the government of France and has received the German Distinguished Service Cross (1997), the Wexner Prize (2002) the Golden Lion of the Venice Biennale (2010) and the Samuel H Scripps / American Dance Festival Award for Lifetime Achievement (2012). Forsythe has been commissioned to produce architectural and performance installations by architectartist Daniel Libeskind, *ARTANGEL* (London), *Creative Time* (New York), and the City of Paris. His installation and film works have been presented in numerous museums and exhibitions, including the Whitney Biennial (New York), the Venice Biennale, the Louvre Museum, and *21\_21 Design Sight* in Tokyo. His performance, film, and installation works have been featured at the Pinakothek der Moderne in Munich, the Wexner Center for the Arts, Columbus, the Venice Biennale and the Hayward Gallery, London. In collaboration with media specialists and educators, Forsythe has developed new approaches to dance documentation, research, and education. His 1994 computer application *Improvisation Technologies: A Tool for the Analytical Dance Eye*, developed with the ZKM / Zentrum für Kunst und Medientechnologie Karlsruhe, is used as a teaching tool by professional companies, dance conservatories, universities, postgraduate architecture programs, and secondary schools worldwide. 2009

marked the launch of *Synchronous Objects for One Flat Thing, reproduced*, a digital online score developed with The Ohio State University that reveals the organisational principles of the choreography and demonstrates their possible application within other disciplines. *Synchronous Objects* is the pilot project for Forsythe's *Motion Bank*, a research platform focused on the creation and research of online digital scores in collaboration with guest choreographers. As an educator, Forsythe is regularly invited to lecture and give workshops at universities and cultural institutions. In 2002, Forsythe was chosen as one of the founding Dance Mentors for The Rolex Mentor and Protégé Arts Initiative. Forsythe is an Honorary Fellow at the Laban Centre for Movement and Dance in London and holds an Honorary Doctorate from The Juilliard School in New York. Forsythe is also a current A.D. White Professor-at-Large at Cornell University (2009-2015).<sup>95</sup>

Susan Kozel combines dance and philosophy in the context of new media: in other words she works with bodies, ideas and technologies. As in her website description, Kozel has a PhD in Philosophy from the University of Essex, UK (1994), and a long history of various movement techniques (from ballet to butoh) but currently works primarily with phenomenology as a methodology and improvisation and a movement practice. Susan is now happy to start her permanent position as a Professor of New Media at MEDEA Collaborative Media Initiative, Malmö University.

She has taught for a range of university programs in the UK and North America (Dance, Philosophy, Interactive Arts, Digital Media) and. She balances her academic life with professional artistic practice at the convergence of dance and digital technologies as the director of Mesh Performance Practices.

She has published widely and performed internationally. Her collaborative performances and installations include the Technologies of Inner Spaces series (immanence 2005, Other Stories 2007 and The Yellow Memory 2009), whisper[s] wearable computing (with Thecla Schiphorst) 2002-2005, and trajets (with

---

<sup>95</sup> <http://www.theforsythecompany.com/details.html?&L=1> consulted January 2013

Gretchen Schiller) 2000-2007. Her writing includes the book *Closer: performance, technologies, phenomenology* (MIT Press 2007) which will be followed by a second book called *Social Choreographies: Corporeal Aesthetics with Mobile Media* (expected in 2012). Recently, she has written chapters for edited collections on performance research in *The Routledge Companion to Artistic Research* (ed. M. Biggs & H. Karlsson, Routledge, forthcoming 2010), and on corporeal ethics in *Throughout: Art and Culture Emerging with Ubiquitous Computing*, (ed. U. Ekman, MIT Press, forthcoming 2011).

Current work includes collaborating with dance scholars and artists Leena Rouhiainen and Mia Keinänen on the *Intuition in Creative Processes* initiative based at the Theatre Academy in Helsinki. This IntuiTweet project experiments with social networking applications (such as Twitter) for improvised performance with the aim of better understanding intuition. Other research areas include the interdisciplinary consideration of bodily expression in electronic music, and the articulation of an embodied methodological basis for artistic research.

She is a member of the Scientific Advisory Board for the Humanities Art and Technology Centre in Poznan, Poland, and the Quality Advisory Board of the Swedish National Research School in the Arts (Konstnärlig Forskarskola).

Susan was born in Montréal, Canada.<sup>96</sup>

---

<sup>96</sup> <http://medea.mah.se/2010/10/susan-kozel-professor-of-new-media> consulted November 2012

## Bibliography

Bannerman, C. Sofaer, J. Watt, J. Ed (2006) Navigating the Unknown. London: Middlesex University Press.

Battier, M. (2000). Electronic Music and Gesture. M.M. Wanderly & M. Battier (eds.), trends in Gestural Control of Music. Paris: IRCAM – Centre Pompidou

Benjamin, W. (1969). The work of Art in the Age of Mechanical Reproduction in Illuminations, Zohn, H. trans. New York: Schocken Books

Bordwell, D. & Thompson, K. (2001). Film Art: An Introduction New York, London: McGraw Hill

Brine, Daniel Ed (2008) The Live Art Almanac. London: Live Art Development Agency

Burrows, J. (2010). A Choreographer's handbook. Oxon: Routledge

Campbell, P. (1996). Analysing Performance. Manchester: Manchester University Press

Charnley, C. Kivimaa, K. (2007) so communication...translating each other's words. UK: Estonian Academy of Art, Tallinn and B. Press

Chion, M. (1990). L'audiovision. Son et image au cinema. Nathan, Paris.

Dix, A. J. Finlay, J. Abowd, G. and Beale, R. (1998). Human-Computer Interaction. Prentice Hall, second edition.

Dixon, S. (2007). Digital Performance. London: MIT Press

Goleman, D. (1996). Emotional Intelligence – Why it can matter more than IQ, Bloomsbury paperbacks.

Goulish, M. (2000). 39 Microlectures: in proximity of performance. London: Routledge

Granjon, P (2007) Hand-Made machines. ZProductions and G39

Gray, J.A. (1989). Dance Technology – Current applications and future trends. Virginia: The American Alliance for Health, Physical Education, and Dance

Harrison, C. (1974) Concepts of modern art, from Fauvism to Postmodernism.

Heathfield, A. (2004) Live: Art and Performance. New York: Tate Publishings

Jackson, S. (2004) Professing Performance. Theatre in the Academy from Philology to Performativity. Cambridge: Cambridge University Press.

Jerram, L. (2008) Art in Mind. Bristol: Watershed Media Arts Centre

Kaltenbunner, T (1998). Contact Improvisation, with an introduction to new dance. Germany. Meyer & Meyer Publishing

Kostelanetz, R. (1992). Merce Cunningham – Dancing in Space and Time. London: Dance Books

Maude-Roxby A Ed. (2007). Live Art on Camera: Performance and Photography. Southampton: John Hansard Gallery, University of Southampton

Miranda, E.R. (2002). Composing Music with Computers. Focal Press

Mitoma, J (2002). Envisioning Dance on Film and Video. New York and London: Routledge

Newman, H. (2001). Performancemania. London: Matt's Gallery

Pacitti, R Ghelani, S. (2010) SPILL Festival of Performance: On Agency. London: Pacitti Company

Rubidge, S. (1999) Defining Digital Dance: Sarah Rubidge examines what constitutes digital dance in Britain today. Dance Theatre Journal, Volume 14: 41-45

Rush, M. (1999). New Media in Late 20th-Century Art. New York: Thames & Hudson

Seashore, C. E. (1967) New York . Psychology of Music

Sofaer, J. (2008) Perform Everyday. Brussels: what

Storr, A. (1992) Music and the mind. New York: Harper Collins.

Truax B. (1984) Acoustic Communication. Greenwood, Westport.

Quasha, George; Stein, Charles (1997) Tall Ships – Gary Hill's Projective Installations – number 2. New York: Station Hill Arts, Barrytown, Ltd

Warr, T. Jones, A. (2000) The Artist's Body. London: Phaidon

Williams, C.(2000). Dance & the Camera, Filmwaves 32-37

Williamson, A. (2008). Performance/Video/Collaboration. London: Live Art Development Agency and KIOSK

Vaughan, D. (1992) Kostelanetz. Dancing in Space and Time. London: Dance Books

## Websites

[www.blasttheory.co.uk](http://www.blasttheory.co.uk) <http://londondance.com/articles/features/merce-cunningham-and-lifeforms> <http://art.net/~dtz/susie.html>  
<http://www.dvpg.net/docs/videospace.pdf>  
<http://www.criticaldance.com/ubb/Forum16/HTML/000078.html>  
<http://www.guardian.co.uk/edinburghfestival2001/story/0,10640,543006,00.html>  
<http://www.randomdance.org> <http://badco.hr/badco/>  
<http://www.narthaki.com/info/articles/article66.html>  
<http://adt.org.au/current/work> [www.exile.at](http://www.exile.at)  
<http://www.fourms.uio.no/projects/mg/index.html>  
<http://people.brunel.ac.uk/bst/vol1001/claudiarobles> <http://empac.rpi.edu>  
<http://openendedgroup.com> <http://www.dancefilms.org/event/meet-the-artist-david-hinton> <http://dv8.co.uk/about-dv8/artistic-policy>  
<http://www.tqw.at> <http://www.charleroi-danses.be>  
<http://www.meredithmonk.org/about/bio.html>  
<http://www.brunel.ac.uk/arts/theatre/staff/johannes-birringer>  
<http://www.tate.org.uk/art/artists/gary-hill-2376>  
<http://www.tate.org.uk/art/artists/bruce-nauman-1691>  
<http://www.tate.org.uk/art/artists/bill-viola-2333> <http://www.dvpg.net/docs/videospace.pdf> <http://www.shobanajeyasingh.co.uk>  
<http://www.ninakov.com> <http://www.dancedigital.org.uk>  
<http://www.dance-tech.net/page/dance-tech-exploring-digital-networks-asmedium>

<http://www.resistdance.de> [http://gdanskifestiwaltanca.pl/en/doc\\_167.html](http://gdanskifestiwaltanca.pl/en/doc_167.html)  
[http://www.compositeurs.be/en/compositeurs/thierry\\_de\\_mey/47/](http://www.compositeurs.be/en/compositeurs/thierry_de_mey/47/)  
<http://www.rosas.be/en/rosas>  
<http://www.guardian.co.uk/stage/2012/nov/04/philippe-decoufle-company-dcareview> <http://www.britannica.com/EBchecked/topic/643417/Mary-Wigman>  
<http://www.imdb.com/name/nm0000923/bio>  
<http://www.imdb.com/name/nm0220305/bio>  
<http://londondance.com/articles/features/merce-cunningham-and-lifeforms>



[http://www.oespacodotempo.pt/en/esp\\_tem.php?idpan=rui\\_bio](http://www.oespacodotempo.pt/en/esp_tem.php?idpan=rui_bio)  
[http://www.musica.gulbenkian.pt/cgi-bin/wnp\\_db\\_dynamic\\_record.pl?dn=db\\_musica\\_bios\\_pt&sn=musica&orn=159](http://www.musica.gulbenkian.pt/cgi-bin/wnp_db_dynamic_record.pl?dn=db_musica_bios_pt&sn=musica&orn=159)  
<http://www.digitalcultures.org/Symp/Isabel.htm> <http://badco.hr/badco/>  
<http://badco.hr/works/whatever-toolbox/> <http://www.blasttheory.co.uk/our-history-approach> <http://www.forcedentertainment.com/page/3009/About-Us>  
<http://www.tate.org.uk/art/artists/jackson-pollock-1785>  
<http://www.tate.org.uk/art/artists/willem-de-kooning-1433>  
<http://www.britannica.com/EBchecked/topic/239341/Arshile-Gorky>  
<http://sugurugoto.blogspot.pt/2012/05/cymatics-by-suguru-goto.html>  
<http://art.net/~dtz/susie.html>  
<http://people.brunel.ac.uk/bst/vol1001/claudiarobles/>  
<http://suguru.goto.free.fr/Contents2/Duali/Duali-e.html>  
<http://www.afterall.org/journal/issue.3/tv.eye.you.video.works.hilary.lloyd>  
<http://www.afterall.org/journal/issue.3/tv.eye.you.video.works.hilary.lloyd>  
<http://londondance.com/articles>  
<http://www.magic.ubc.ca/~adulic/kenneth/va371/readings/Intersections%20media-action-place.pdf> <http://www.drawingandthebody.com/intro.php>.  
<http://www.youtube.com/watch?v=5hpz684cve8>  
<http://people.brunel.ac.uk/dap/condip2.html>  
<http://interaktionslabor.de/lab11/index.htm>  
<http://vimeo.com/channels/performanceacademy/27805932>  
<http://artistresearcher.wordpress.com/2010>  
<http://medea.mah.se/2010/10/susan-kozel-professor-of-new-media>  
<http://www.backstage.com/advice-for-actors/dancers/improvising-dance/>