The Structural and Aesthetic Capacity of Sonic Matter

REMARKS ON SONIC DRAMATURGY

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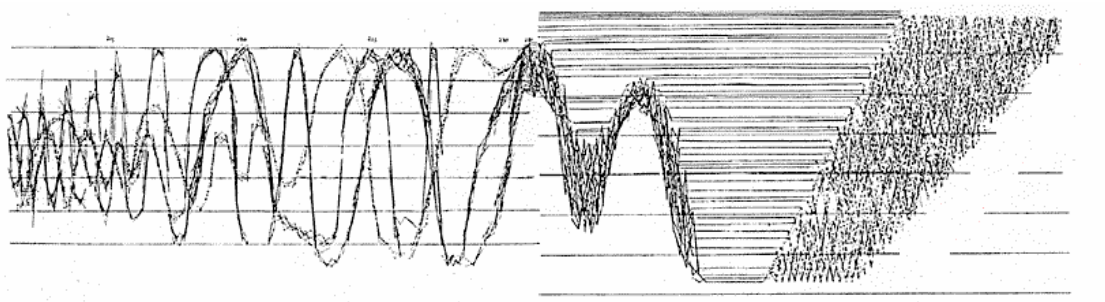

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Abstract

This research study focuses on my compositional practice and its related creative strategies. It describes a series of ideas relevant to the structural and aesthetic capacity of sonic matter and the notion of sonic dramaturgy. Its thread of enquiry is based upon transformational logic and the inner nature of sound. The ontology of sound matter, its intrinsic nature and perceptual and cognitive effects, is of primary relevance. This can be contrasted with a permutational approach – the *ars combinatoria* – that has prevailed in Western Music after the Renaissance.

There are four boundaries in which my conceptual compass operates:

1. The intrinsic logic of the sound-material
2. Form as organisation immanent to sonic matter
3. Form as *Sonic Dramaturgy*
4. The relevance of listeners' perceptual and cognitive capacities.

It is easily understandable that an empirical and experiential attitude manifests itself from the above. My aim is to examine in practice, *that encounter* and *that creative friction* which occurs between sound-matter and the human mind, and as a result *a priori* schemas have been avoided.

Contents

INTRODUCTION

Caught between
too much to say and too little,
the approbation of life remains
forever inexpressible.
Clément Rosset

Introduction

For a composer, a refined amalgam of thoughts, influences, skills, personal experiences, knowledge and understanding support all his or her creative musical efforts. To develop a fruitful context could be seen as a clarification of certain decisions; a tracing of the compositional paths that have been undertaken. Thinking on praxis.

My research originates from the idea that matter governs form. As a result, I focus on the structural and aesthetic capacity of sonic matter and how it relates to the work submitted. What is *sonic dramaturgy*? What is *aural perception*? What is the *ontology of sound*? These are the main research questions in which this research-study is based.

Sonic Dramaturgy refers to a non formalistic attitude to sound phenomena and the creative friction that occurs between sonic matter and the human mind. It is the search for an aural dramaturgy (in the classical meaning of drâma or drân); a search for a sound that acts; an active sound.

Auditory perception is related to the deeper understanding of sound phenomena and their perceptual dimensions. Hence, and as part of the effort to disclose the ontology of sound, I work especially with elusive – not easily recognisable – timbres and sound structures as well as extremes of aural thresholds. In that way, sound is not perceived as something fixed and closed but as something embedded with an open hermeneutic horizon.

With this strategy a refined sense and understanding of what kind of things *sounds are* and *what they can do* might be revealed to us.

The ideas that follow span different compositional and sonic areas, namely electro-acoustic (live and in the studio) improvisation collaborations, instrumental music and installations. There are certain aspects and research questions that are shared, while others are distinct. An enrichment in compositional thinking comes through their shared and unshared thoughts on sound's many-sided capacities. My approach views composition not in terms of medium or genre, but as ontological activity conditioned by intention and reception/perception.

Therefore, the consistent and underlying current throughout this enquiry is *sound's creative capacity as it is observed and thought* through my experience as a composer, listener and performer. The conceptual fabric of this research expands from questions about sound's structural and aesthetic capacity as they spring from the notion of sonic dramaturgy. There are also other concepts that orbit continuously around my main conceptual axis: sound spectra, the phenomenology of sound, embodiment, space, morphogenesis, composition and improvisation.

There is an inherent difference between composing music and writing about it. Music making – as every creative act – is primarily based on a continuous feedback loop of a non-linear process between the artist and his/her work. In that activity there is always the risk of failure, discovery and rapport. A reflective commentary requires linear, sequential reasoning that comes after the fact. It is fundamentally different to work directly with sound-matter than to describe, analyse, and explain this activity through words: "Art's substructure is shaped by deeply unconscious processes and may display a complex organization that is superior to the logical structure of conscious thought" (Ehrenzweig 1975: viii). It is rather clear that music and sound making is ontologically different from verbal reasoning.

I conceive sound-matter as defined by its physical components, the spatial acoustics in which it is heard, and its perceptual and affective dimensions. While

the first two can be analysed and described in some quantitative and/or phenomenological manner, the other is more elusive and difficult to deal with, notwithstanding research in composition, psychoacoustics, and philosophy.

My approach stems from the idea of observation as a principle of sonic work. Sound-material is immediate, transient, elemental, fragile and at times cruel; a "natural" event that happens somewhere-sometime irrespective of pre-fixed/empty structures. Creative discovery places the manifold before the formal, through constant perceptual and cognitive feedback loops. The wondrous forces of sound-matter create a many-sided arrow of time that expands, extends and has a certain magnitude. "It is matter that governs form" (Bachelard 1983: 119). It will not come as a surprise then to state that I conceive music as an aural terrain with certain affective and conceptual affordances. I find this kind of geological metaphor useful as it combines both the materiality of sound and its perceptual and affective attributes.

Composers who are especially relevant to this study are Luigi Nono particularly his later work, Horatiu Radulescu, and Francisco López. These are composers who have worked closely with the interiority of sound and its transformational and experiential capacity. Particularly relevant to my practice are ideas such as: the dramaturgy of sound, spectrality and intensive listening.

Luigi Nono's works such as *Fragmente - Stille, An Diotima*, *Das atmende Klarsein*, *Quando Stanno Morendo, Diario Polacco N.2* focus on the dramaturgy of sound, micro-acoustic phenomena, close listening, fertile silences, the plasticity of sound, and concentrated listening. Sound-matter governs form:

> I would begin by choosing the material – intervallic, timbral and rhythmic. I'd then experiment with this material, perhaps subjecting it to various predetermined processes – but only to see in which direction it could develop. And then I'd compose, deriving a suitable form from the material and the possibilities inherent in it. For me, composing was never merely giving concrete expression to preformed structures. I kept the decision open to the very last minute
>
> (Nono in Irvine 1999: 88).

What does it mean to compose music? What makes someone want to

compose? Music in its most profound aspect and as a very distinguished ontological entity can make us experience the un-thinkable, that which is beyond discourse. It gives us the ability to access other levels of consciousness and awareness therefore can be viewed as an agent of transformation.

Horatiu Radulescu's work with sound spectra delves into the deep structure of sound to create intricate and refined compositions such as *Clepsydra, Frenetico*, and *Iubiri.* He avoided the many dead alleys of modernism and post-modernism by working closely with the nature of sound itself, while influenced and informed by his own native heritage especially Byzantine music, with its continuous micro-intervallic sonic flow. He also paid similar attention to the nature of sound in other cultures such as in Indian music; music that relates directly with sound itself and its intricacies. "I think it's the tendency of many cultures of the world to be as close to the sound as possible, to the secret deep structure of sound, which is spectrality" (Radulescu in Gilmore 2003: 107).

An immersive quality characterises music that focuses on the intrinsic structure of sound. There is a total absence of compositional or other rhetoric, but instead, a trust of sound's creative capacity, as a request, for another kind of listening sensibility.

> For me the most important is to be very close to, for example,
> Josquin Des Pres, because you have the feeling of a fresco;
> you forget the technique and you get into a special atmosphere,
> a special state of sound (Radulescu in Gilmore 2003: 107).

Francisco López's work is another recent example of work in the depths of sound-matter, unconcerned by pre-conceived notions of sound structures and forms. Sound-matter is viewed as an adventure of the human spirit and the world as an instrument. A deeply phenomenological approach to sound has led him to place the aural above anything else, by exploring what he calls profound listening. "I believe in the possibility of a "blind" listening, a profound listening that delves deeply into the sounds" (López 2001: 163). It is a fact that the *acousmatic* approach to sound is an undercurrent in musical thought – envisioned by the Pythagoreans – that permeates the musical thinking of those

genuinely interested in the interiority of sound-matter. “My compositions are offered as openings through which the listener can access and focus on this inner world of sounds, the transcendental dimension of the sound matter itself” (López 2001: 163).

I am primarily interested in spectral confluences and collisions that disclose the nuclei of force of sonic matter. Therefore my research originates from the idea that matter governs form. In consequence I focus on the structural and aesthetic capacity of sonic matter in relation to the work submitted. What is *sonic dramaturgy*? What is *aural perception*? What is the *ontology of sound*? These are the main research questions in which this study is based on.

The works have different presentational formats from fixed-media to sound installations and from live electro-instrumental collaborations (as recordings and/or performances) to written scores.

Electro-Acoustic

2005 Inscape 10 **(**Sound projection at TU Berlin WFS-hall with Klangdom – 2008,

Inscape 11 and *The Warehouse* as part of the cutting edge series 2009**)**

Inscape 5 **(**was amongst the selected works at the International Competition deMusique et d'Art Sonore Electroacoustiques de Bourges 2005, in the category œuvre d'art sonore électroacoustique**)**

Nekyomanteion **(**selected for a Honorary mention by Morton Subotnick, François Bayle, and Miguel Azguime at the 7th International Electroacoustic Competition Musica Viva in Lisbon. Broadcasting by CKLN–FM Toronto: Electric Storm 16 July 2007, Elektra Music Bourges Feb 2008, RTP – Radio Portugal Antenna 2 – 3 March, Polish Radio 6 March 2008, FM–Brussel : Sounds and Emotions – Playlist 240 – March/April 2008**)**

2006 Childhood’s Vertigo

2008 A Scar In The Air **(**CD release on Aural Terrains **–** Broadcasting by BBC 3 – 26 February, RAI 3 – 4 March, Onda Sonora – 11 July – Madrid 2009**)**

2009/10 Subterranean Sky **(**CD release on Aural Terrains record label**)**

Collaborative

2007 Phosphoros, (with Dario Bernal-Villegas) **(**209radio on 105 FM Community Radio in

Cambridge – Bluetone 1st May 2008)

Sonoric Clay (with Dario Bernal-Villegas) (FM–Brussel : Sounds and Emotions –

– Playlist 266 – October 2008, Elektra Music Bourges November 2008)

Installations/Environments

2005 Encounters, a generative multi-channel electronic soundscape

(Goldsmiths Feb. 2005, Diapason Gallery – Brooklyn, October 2009)

2007 RoomMaze sound installation/environment

(P60 Artpool Gallery – Budapest, October 2007)

Instrumental

2006 Into the Distance (solo bass clarinet in B♭)

2008/09 Passage Dangereux (prepared + toy piano, soundscape, + DVD)

(for Kate Ryder, first performance at *The Warehouse* 14 November 2009)

While each work presented in the folio started with its own specific compositional and conceptual setting, the problem of the relation between sonic matter and form percolates through all of them, closely connected with the notion of sonic dramaturgy.

Chapter 1 begins with a discussion of the relationship between sonic matter and form in the compositional process. The notion of form that crystallised in Western classical music since the Renaissance is not relevant to an approach that conceives sonic matter and form as two interdependent facets of an undivided process (ενέργημα). In addition, the permutational/combinatorial structuring approach pre-dominant in the composition of notated music (independently of the method or style involved) eschews any deep questioning of the relationship between sonic-matter and form.

In this thesis, form is conceived as the product of a continuous, creative feedback flow between human mind and sonic-matter. This schema allows me to think of the relation between sonic-matter and form both in the solitary practice of composition and the collaborative aspect of making music with others in live improvisational performance. In that sense, I conceive music making as an act, ως μια δράση, ένα ενέργημα; hence my focus on the notion of sonic

dramaturgy.

Pre-conceived formal and structural schemata tend to view the notion of shape as something separate from the material aspect of sound-events. In that sense, 'Form' is conceived as an empty vessel, as a pre-determined – to various degrees – schema. I favour a notion of form that exists undivided from the concrete condition of sonic-matter.

Μορφοποιώ, σχηματοποιώ means to give shape e.g.: to a composition, to a sculpture, to an idea. It is the *activity* of giving shape to something that is emphasised in this research-study in contrast to the idea of a form that pre-exists or follows combinatory rules to which the material is subjected.

The first chapter ends with remarks on sonic space and sonic dramaturgy. An approach that thinks and works on the condition of sonic matter – in relation to the overall form – not only involves visual and tactile associations, but also creates a more pregnant condition between temporal relations (from past to future sonic gestures) and spatial ones (permeation, textures, localisation). Just as we can talk of a pictorial space in the visual arts, so we can speak of an aural space with its own intrinsic and specific dramaturgy and imagery in the sonic arts.

In chapter 2 I examine certain listening dimensions of sonic matter and the high dimensionality of auditory perception. Interest in auditory perception is the quest for a more profound understanding of sonic phenomena that illuminates and deepens one's experiential relation with sonic matter and examines how musical form imprints in memory.

The detailed discussion of such listening dimensions as timbre, pitch-height, sound-movement, localisation, distance, direction, and density amongst others, expands with remarks on our perceptual experience based on the 'Auditory Scene Analysis' theory and its findings. The auditory processes (ενεργήματα) of *innate* and *learnt* schemas coexist for the decomposition and grouping of manifold acoustic information (as in music and our everyday environment).

In chapter 3 further remarks on sonic dramaturgy can be found alongside

the commentaries of certain works that consist of fixed media, scores, collaborative recordings and installations. Sonic dramaturgy is contrasted and opposed to *ars combinatoria* and its established mode of thinking and working. The manifold aspect of creative music is emphasised through a series of thoughts about composing beyond the combinatorial and procedural compositional paradigm.

SONIC MATTER ⇆FORM

1. SONIC MATTER ⇆FORM

Marco Polo describes a bridge, stone by stone.
“But which is the stone that supports the bridge?”
Kublai Khan asks.
“The bridge is not supported by one stone or another”
Marco answers, “but by the line of the arch that they form.”
Kublai Khan remains silent, reflecting. Then he adds:
“Why do you speak to me of the stones? It is only the arch
that matters to me.”
Polo answers: “Without stones there is no arch.”
Italo Calvino

If sound-matter is conceived to be the primal unit of music, it seems unlikely that the mistake by Kublai Khan will occur. But Marco Polo asserts that the bridge is not supported by one stone or another but by the line they form. What is then Khan’s mistake? While he seems to recognise that the stone bridge is structured to a series of *invisible* forces that push and pull in different ways, thus forming a curved line, he fails to perceive the relationship between particular material (stone) and resulted form (arch).

He would have not failed to understand their mutual relationship and interdependence if Marco Polo would have been able to contrast the stone bridge with an iron or steel truss bridge (which of course would not have been possible at that time). In those bridges he could possibly have been able to observe that each metal beam is set at a particular angle in response to a corresponding force (compression, tension, shear etc.). In that sense, Kublai Khan would have been able to see, that such a bridge, does not hide the forces in action but instead its beams act like a drawing of the forces in operation. Thus

at the end he would have become aware of the interconnection of matter and form. Moreover this could have made him think on the fact that while arch bridges can be formed from iron or steel the truss bridges are not actually made by stone.

My belief is that sound-matter governs form, and this can be described in terms of morphogenesis. The interdependence of matter and form has been realised in fields such as emergence, molecular chemistry, biology, plant formation and others. I am interested in how this concept is relevant to the artistic process of composing with sound-matter. I have always been amazed how the same material entity takes different forms and shapes e.g.: water as liquid, vapour, ice. Hence, my appeal to the idea that "matter is the unconscious of form" (Bachelard 1983: 50). The scheme: sound-matter**/**form is at the core of my enquiry.

For Aristotle, form was the principle of intelligibility since it is through forms that we apprehend the complexity of the world. For the purposes of this study I treat the notion of form not in its strict sense, as an abstraction, but as shape. "When 'form' is used in the strict sense of the concept, it does not refer to any physically existing thing. Form is an abstraction. […] Form always permits a description, and no actually existing thing can ever be fully described by an abstraction" (Arnheim 1996: 151).

Sonic-matter has its own resonant acoustic form either as a single sound or as an aggregate of sounds. Therefore I do not consider sound-matter and form as two separate and distinct elements but as two interdependent facets of a certain active process-event (ενέργημα) within which the notion of a non-passive and detached observation constitutes the primary principle in the compositional process of sonic work. Sonic-matter performs its own form.

There is a continuous, creative flow between human mind and sonic-matter that results in a certain auditory formation and shape. It is the friction between sound-matter and an artistic temperament that connects the unknown with the clarity of mind and hearing.

1.1 Form – Structure

Discussing form inevitably brings into the picture the notion of structure. Sonic form can be defined as the overall contour and the mutations/differences of some attributes of sonic-matter in time and/or space. On the other hand *structure* can be indentified as the internal sonic relations, the internal logic between the parts and the parts to the whole.

The most common structuring device in most notated/printed music is *permutational* as its general principle is to permute/combine a certain fixed set of pitches/durations. James Tenney likened this to “a kaleidoscope, in which all of the perceived forms are the result of the continually varied juxtaposition of a fixed set of gestalt units” (Tenney 1969/70: 15). These structural devices “look more into form as a linguistic syntax than to form as structure” (Toniutti 2007: Part Three). From a socio-historical standpoint the permutational and calculable structuring devices appear as a consequence of a certain rationalization and standardization of music in the Occident – especially – after the Renaissance, as I will further discuss in the third chapter, with some specific examples.

Developmental structures constitute another large class whose underlying principle of development and growth is essentially organicist. These types of structuring strategies “use a much wider range of transformations (though also including permutation)” while they “usually proceed like some natural process in which the gestalt units at the lower level undergo perceptible changes also, as well as creating changing shapes at the higher level”. (Tenney 1969/70: 15). Such structures are based primarily on the pairs simple-complex, expansion-contraction, and linear procedures. They could be compared with the growth of a flower or a tree.

There are also *statistical* structures which can be compared to, or may directly model, natural processes such as the flocking of birds or fishes or molecular interactions. While such structures might share with the above the same simple-complex, and expansion-contraction organizational pairs they work with and exhibit non-linear temporal structure.

Particularly relevant to electronic music are *morphological* structures, based on the sonic-matter itself and its shape. Such structural devices are based on the morphology (sonic form) and spectral information (frequency content) of sonic matter. The affinities/contrasts between sound-events provide a strong compositional premise for structures designed on the basis of morphology. Incorporating and absorbing sounds and noise from reality, as well as composing the sounds themselves, generates structural relations that open a fertile relation between the notions of gesture and spectrum and the notions of emergence and form as they do not rely on conventional auditory forms. These aspects make them relevant to emergent forms, spontaneous order and improvisation.

The first two structural types can be defined as procedural, treating composition and time as a succession of steps while the third type, which focuses on sonic-matter itself and the 'experiential time' of sound-events, has a more direct, immediate and intimate relation to the temporal evolution of sonic structures, their unfoldings.

The ultimate concern of my practice is thinking about the creation and destruction of sonic forms and the experiential validity of sonic-matter.

1.2 Sonic Matter

Forces, by their nature, are abstract.
They can be felt but can neither be seen
nor heard nor touched. In the world
surrounding us, however, these forces
are embodied and therefore can
be perceived.
Rudolf Arnheim

What is continuous and discontinuous? How does one sound event lead to another? Through a discrete leap or a continuous movement? What kind of structural importance do these notions have? What is the difference between

aural structures as continuous flows or discontinuous units/blocks? These questions are very relevant to this thesis. In my view, the problem of continuity and discontinuity is at the core of compositional thinking. The answers to these questions largely define a composer's structural and aesthetic orientation.

For the purposes of this research the first composers who grasped the significance of the internal life of sound were those working in the studios of post-war Europe with tape–recorders, microphones, electronic oscillators and filters. It appears that the *acousmatic* spirit of the Pythagoreans was revisited and revitalised through recorded sound. Studio work opened up a new sensibility and a whole range of extended sonic vistas to many composers and musicians.

Two distinctive examples are the composers György Ligeti and Luigi Nono. Their music acquired new insights and aesthetic paths. For Ligeti this was evidenced by polymorphous sonic flows and intricate textures of multi-layered polyphony, free of metre and pulse (see Ligeti 1965: 8-9). Nono pursued a life-long exploration of the timbral possibilities of instruments with a passionate interest in the reverberant and resonant qualities of space and music and their mutual influence and interdependence (see Pape 1999: 59-60).

Personal computers allowed musicians to encounter this "micro–universe" outside institutional studios, and to create another level of interaction between composition/performance/distribution and a more independent route of music-making.

Even though an awareness of the inner structure of sound has been associated with the advent of electro-acoustic music, the insights gained from this approach were quickly applied to instrumental music as well. In addition to the common qualitative properties of sounds, traditionally described in terms of pitch, loudness, duration, and timbre, other elements have been added including critical band, formants, transients, brilliance, magnitude, density, shape, distance, movement, and direction. Some of these attributes have quantifiable counterparts e.g.: in frequency, amplitude, temporal length, and spectrum. But the most important in my view, is the resultant expansion of our vocabulary

when discussing, describing, and analysing sound phenomena.

For the creative musician, sound-matter is a many-sided phenomenon. Composition is nothing else but shaping and organising sonic phenomena and ultimately it is working with their inner forces. Traditionally, pitch and time were considered the primary dimensions of sound-matter as Wishart remarks

> What notation demands is a finite set of pitch-levels which we can permute and combine.The refinement of instrument technology attempts to impose this discrete permutational rationality upon the very production of sounds, and our ears learn to approximate our acoustic experience to the discrete steps of our imposed logic. (Wishart 1996: 23)

But in electronic music and recorded-sound the multidimensionality of sonic-matter has been revealed. Moreover, “sound itself has been recognised as a kernel of musical form by reason of its entry and decay processes (really it is complete, though tiny autarchic form), and it can serve as a possible archetype for structural sequences” (Ligeti 1965: 18).

Hence, the internal shape of the sound itself became a kind of archetype for larger sonic structures. It seems that sonic dramaturgy takes seriously the idea that sonic matter is the unconscious of form (see Bachelard 1983: 50) and that each sound has its own life.

The intrinsic schemata of sound-matter have made composers more aware of micro-relationships and new perceptual thresholds. The microscopic and the telescopic became relevant descriptors, especially for those who respond positively to the idea that sonic matter governs form; form as something emergent not as *a priori* formal schema.

Independent of each composer’s criteria there is evidence of discontinuity in the microscopic domain of sonic-matter. A seemingly continuous tone when closely examined can reveal gaps of fluctuations (see Roads 2001: 330). On the other hand, the human “ear in fact listens in brief slices, and what it perceives and remembers *already* consists in short syntheses of two or three seconds of the sound as it evolves” (Chion 1994: 12). Our hearing creates perceptual groupings of continuous aural streams (see Bregman 1999: 9-11). Thus, it is

clear that there is an interplay between continuity and discontinuity and the way we perceptually relate through memory.

> The capacity of memory structures in music listening is of paramount importance since musical structures are extended in time. The perception of movement, of transformation and of musical significance depend on the perceived element being heard in relation to remembered elements. We might say that perception really only becomes musical when it is ‘‘in relation to’’ events, sequences, progressions and structuring in memory. The form of a piece of music is what gets accumulated in memory, and thus the richness of that form depends very heavily on one’s capacities and experience as a listener. (McAdams 1987: 22-23)

In my practice I consider continuity and discontinuity complementary views of sonic matter, as both are closely interwoven with *movement,* which is intrinsic to musical gesture and the spectrum. The time scale that a composer chooses to focus and work upon inevitably defines the approach to musical form. It seems that when the ear focuses on the interior, microtemporal movement of sound-matter, it tends to lose track of the macrotemporal overall shape.

> What remains of the dynamism of global structures when with our ears riveted to the *internal* dynamism of sounds like the eye to a microscope, we become deaf to every *macrophonic* event, or more precisely to all forms of relationships linking these events [...]? (Grisey 1987: 259)

For example, a leaf viewed under a microscope does not reveal its overall shape in its internal structures. If we see and recognize a leaf before microscopic observation, there is a fusion, an interplay, created in our minds between its internal morphology and its overall external shape. In that sense, different perceptual scales operate in every aesthetic phenomenon, including sonic matter. Hence in my practice I consider (both as composer and listener) perception as *elastic* and multileveled. Conscious and unconscious faculties work and focus on different levels. “The articulating tendency of our observing conscious mind notices and grasps simple, compact, precise forms, while the vague, irregular, indistinct and even the confused are the perceptual areas of

the unconscious mind" (Ehrenzweig 1975: 3-4). In working with sound-matter one becomes aware of "structures which are no longer fixed to a single type of perception" (Grisey 1987: 268).

What if we posit sonic relationships as emerging from the internal dynamism of the sounds? What happens if we consider sound-matter and form as complementary aspects of the compositional design? Viewing overall aural shape as an emergent property and as an unfolding feature of sound-matter gives it an almost unlimited and inexhaustible character. Hence we can apprehend that as the historical state of the material is different each time, new forms are always developed. It appears that the imagination of forms is unlimited because the imagination of sonic matter is unrestricted.

If we view these aspects not as a dichotomy but as a *space of possible states*, we can start applying the different perceptual scales that might coexist between a complex sound, sound-event or an aggregate of sound-events, and the overall shape of a work. Perception is not only shaped by the forms it encounters, it also shapes the sonic phenomena. It has plasticity.

In 2004, I visited a gallery space at the *Museo Michelangelo Antonioni* in Ferrara, Italy which is devoted to his paintings. Part of the exhibition was occupied by *Enchanted Mountains* a collection of pictures created after a process of magnification and enlargement of very small paintings.

> The process of 'The Enchanted Mountains' wholly consists in enlargement. It is the enlargement that discloses in detail the invisible material in the original picture. If it is true that by scribbling on some pieces of paper I escaped from cinema, it is also true that somehow I approached it through photographic enlargement.
>
> (Antonioni in Chatman and Duncan 2004: 151)

This enlarging process brought the material into a different morphological scale, revealing previously imperceptible textures and shapes. Moreover, a contrast between the different perceptual scales became apparent from the moment the magnified, blown-up pictures, were exhibited alongside the tiny ones from which they were taken. Something similar occurs with time-stretching e.g.: a sound-

event's time-stretching creates a similar aural result. Even a certain kind of slow-pace music can be viewed as a kind of aural magnification. I find the idea of coexistence between different perceptual scales relevant and active in spectral composition, and in certain cases of radical electronic composition.

The term *sonic matter* points to a molecular aesthetic of sound. And indeed within this realm I discover *values of intensity* in the same way that "the engraver enables us to rediscover values of force in exactly the way that the painter shows us the values of light" (Bachelard 1971: 61).

With such an approach, conventional categories and traditional musical terms such as harmony, melody and rhythm become insufficient conceptual tools and vocabulary. That is why the term sonic dramaturgy supports and better describes my own practice, both in composition and live improvisational performances.

1.2.1 Sonic Space – Sonic Dramaturgy

In the depths of matter there grows
an obscure vegetation;
black flowers bloom in matter's
darkness.
Gaston Bachelard

In the face of Schopenhauer's idea that music "is perceived solely in and through time, to the complete exclusion of space" (Zuckerkandl 1973: 270) it is not uncommon to find spatial metaphors, and spatial attributes in musical discourse. As Lakoff and Johnson remarked "Most of our fundamental concepts are organized in terms of one or more spatialization metaphors" (Lakoff & Johnson 1980: 17). To name but a few: from high to low pitches, horizontal–vertical–diagonal relations, amplitude and spectral envelopes, background–foreground strata, intervallic spacing, distance–direction–movement, scales and harmonic or timbral fields suggest a strong relation between music and spatial traits.

> By imagining or listening to music in which the progress of sounding events is primarily temporal, imaginary spatial relations emerge on several levels. In the first place on the associative level, as changes in pitch height (the word in itself refers to spatial analogy) evoke the vertical dimension, the persistence of a particular pitch height evokes the horizontal spatial dimension, while changes in timbre and intensity, such as differences between open and muted sound, produce the impression of proximity and distance, in a general sense an impression of spatial depth. Musical gestalts and events appear to us as if they take up certain positions in the imaginary space evoked by themselves. (Ligeti 1966: 23-35)

It seems that the adventure of electronic music and recorded-sound in post-war Europe is to a certain extent responsible for the extended use of spatial terms and related vocabulary in compositional design and thinking. It appears that spatiality and plasticity are a natural consequence when a composer works *directly* with sound-matter. The composer is simultaneously the performer, in that he or she has direct control over the quality of the realisation. The musician takes on a function similar to that of the painter (see Boulez 1957: 19). When a composer approaches the sound material directly, eschewing any kind of mediating activity (conductors, performers and/or conventional settings of presentation) then he/she approaches the working methods of the visual artist. The more directly related to the *aural*, the more it resembles, in method, the visual. This is closely related with Morton Feldman's insistence that music can learn from painting "from this more perceptive temperament that waits and observes the inherent mystery of its materials, as opposed to the composer's rested interest in his craft" (Friedman 2000: 21). Through such a route the plasticity of sonic space is revealed.

It appears that a compositional approach that concentrates on the conditions of sound-matter not only brings with it visual and tactile associations, but also creates a conversion of temporal relations into spatial ones (see Ligeti 1965: 15). Instead of a conversion, I would rather say that it creates a more pregnant and fertile relation between the temporal and the spatial. I refer to this phenomenon as *a topological view of time* in relation to compositional design.

This is not related to geometric and architectural metaphors or combinatorial methods in composition; it is an aural philosophy of discovery that places the manifold before the formal through constant perceptual and cognitive feedback loops. By this I mean an active perception/cognition that is "creative because it is much more than looking, hearing, or feeling. It explores the nature of things quite actively" (Arnheim 1996: 39).

1.2.2 Auditory Field

Inside and Outside are inseparable
The world is wholly inside and
I'm wholly
outside myself.
Maurice Merleau-Ponty

Apart from the fictional sonic spaces of composed works and the specific distribution of instrumental groups or loudspeakers in performance space, sound-matter has become recognised as a spatial condition of our environment.

Sonic-matter creates space and informs us about the cultural and social conditions of our environment. The background sonic environment started to get special attention during the second half of the 20th century (John Cage's 4'33'', Murray Schaffer) and became the foreground material and focus for artistic practice; acousmatic environments, where undefined sounds seen to come from everywhere and nowhere – especially in urban spaces – have been conceived, incorporated, used and researched as part of sonic work.

The work of Iannis Xenakis (Polytopes), David Tudor (electro-acoustic environments like 'Rainforest IV'), Bill Fontana, and Max Neuhaus offer early examples of artistic art based on the relationship between sound and space. The adventure of film-sound also contributed to sound being viewed as a constituent and vital part of an overall setting or environment. This concern for the auditory field still informs the work of many younger composers and artists who work with field-recordings and sound-installations.

"The Dasein is in the Atmosphere," as Michel Serres has remarked, and sonic-matter plays its role for the perception and apprehension of an atmosphere, the grain and the sense of a place, the living space.

The sonic-space as *auditory-field* is not music

> In an auditory field, people are free to listen to whatever they turn their attention to. Their listening is non-directed, their attention is free to roam, allowing them to take an active part in the creation of meaning by resurrecting the grain of the field. In this way the listener enters a non-linear, non-directed mode of reception. (Cascone 2009: 4)

Beyond the false modernistic view of music as a universal language, the focus on notions of the auditory-field, atmosphere, and perceptive hearing brings awareness of sonic-matter as a spatial condition beyond the confines of the "concert-hall" and conventional music performance settings.

The interactions between man and the environment find a strong parallel in the practices of free improvisation and sound-installation. Both share an understanding and apprehension for the 'living space' and real environment. The indefinable and elusive feel/sense of specific rooms, places and performance conditions intersect with the notion of atmosphere, that "almost objective sensation spilled into space" (Böhme 1993: 113-126).

Thinking the specific performance and staging settings of a given composition or live-performance as well as making sonic work that evolves with one's environment "as a continuum" makes the above short discussion particularly relevant to this study's quest for an 'active' sound through the notion of sonic dramaturgy.

1.2.3 Sonic Dramaturgy

Understanding how forms can be organized is a vital enquiry for those thinking and working with sonic-matter beyond conventional and worn-out musical categories. I believe there is a dramaturgy of sonic forms imbedded in the inner nature of sounds. When they come in contact with the human spirit their

singularity unfolds as an experiential act. In that act – at times – we, as listeners, find ourselves.

Dramaturgy as a word has its origin in the early Greek word *dramatourgia*/ δραματουργία. Its etymology comes from the verb *δράν*/δρῶ meaning *to act upon*, *to perform, to do* and connotes *an action, an event.* I identify sonic dramaturgy as the act of revealing musical activity as an act and a deed, an event, either when composing or when collaborating in live improvisational performances.

Sonic dramaturgy suggests a dissolving of the strict divisions between sonic-matter and formal concerns. As I observed above, sound performs its own form. Now, being created from within the inner nature of sounds are there any principles that shape this dramaturgy macroscopically?

I have found certain film-makers illuminating and inspiring in their manner of creating temporal structures and continuities through long-takes, travelling shots and other montage techniques in order to achieve a sense of orientation and dramaturgy.

Some structural principles that I employ include:

Metric→←Non-Metric

Static→←Dynamic

Temporal Continuity→←Temporal Discontinuity

Fusion→←Collision

Permeability→←Juxtaposition

Distance→←Proximity

In the context of my practice these pairs can be described as conceptual vectors that support the trajectory of certain compositional or performance decisions. In sonic dramaturgy what is at stake is “not the seeking out of new sounds but rather alteration of people’s ability to hear” (Lachenmann 1999: 26); what is at stake is to make viable the always fragile possibility to find oneself.

AUDITORY PERCEPTION

2. Auditory Perception

In this section I examine certain listening dimensions of sonic matter in relation to music. Sonic matter as a physical and psycho-acoustic phenomenon is closely connected with auditory perception. The following discussion is largely based on relevant studies and my own experience as composer, performer and listener. The aim is to create a relevant and fertile ground for the chapter that follows in which I further discuss sonic dramaturgy while commenting on specific works.

Interest in auditory perception is the quest for a more profound understanding of sonic phenomena that illuminates and deepens one's experiential relation with sonic matter. The effort to discover the high dimensionality of auditory perception is, in fact, an exploration of the ontology of sonic matter.

2.1 Listening Dimensions of Sonic Matter

2.1.1 Timbre and Pitch Height

If sonic matter governs form then it is necessary to discuss some of its intrinsic dimensions. In this section I introduce certain facts on sound matter based on relevant studies and my own reflections and commentary.

The basic microtemporal dimensions in music are *timbre* and *pitch height,* perceived within a fraction of a second (see Christensen 1996: 68). Timbre and pitch height are closely related elements of a given sound. The former is the perceived quality of a complex aural spectrum and the latter, the experience of a certain height in the vertical and natural dimension of pitch range. Pitch height does not necessarily correspond to the perception of pitch. As is well known, only *certain* sounds project a sense of clear, distinct pitch while *nearly all* sounds

display timbre and pitch height.

> *Timbre* as such is a qualitative dimension, memorized as the prominent quality of a particular sound source or sound event […] *Pitch height* possesses the qualities of brightness and clarity in high registers, fullness and sonority in medium register, and dark and diffuse qualities in low registers. Even the electronic sine wave tone displays different qualities in different registers.
>
> (Christensen 1996: 44)

Pitch height is described variously in different cultures. For example in Ancient Greek and Byzantine music a sound is described as *ὀξύς* sharp or *βαρύς* heavy according to its pitch height. These words describe a sound's qualitative aspects according to this aural dimension, but nonetheless they also reflect a certain pitch area. In English, the common pair of high-pitched / low-pitched reflects both the *potential* measurable aspect of pitch height and at times also its qualitative nature. When the natural frequency continuum of pitch height is divided, organized and grouped according to a particular set of rules, then specific scales (*scalar* connotes the vertical natural pitch continuum) are produced. This suggests that pitch height is also *potentially* a measurable dimension *as specific pitch*. Pitch then is represented as notes or frequencies (Hz).

It is well known that most instruments were built primarily to produce pitch. Each instrument displays a certain pitch range and in most cases is associated with a specific musical function. Hence most instruments are connected to a specific idiom or tradition and are closely bonded with the historical state of the musical material. Music is defined to a large extent by the development of musical instruments and vice versa.

In the developments of musical instruments, the dimension of timbre was closely linked with that of pitch, despite being considered a secondary feature of sound matter. A radical disclosing of *timbre* was made possible by electronic music and recorded-sound while certain composers started to realise the strong bond between timbre-pitch and their interdependent existence as *sound spectra*.

In addition, the inner matrix of sonic matter has been disclosed as a

continuum of possible states and not as sharply divided parameters. Hence it is relevant to distinguish between two different compositional approaches: One that prioritises pitch, which is the dominant paradigm, and tends towards a permutational/combinatorial compositional logic, and the other that focuses on sound phenomena as self-contained composed kernels.

For me the ontology of sonic matter is located in this multidimensional nexus. It is within this realm that someone can follow and apprehend the *sound being* and in fact be absorbed and transformed by it.

> The whole phenomenology of the birth of a sound is implied. That does not depend only on physical aspects, like the trajectory of a bullet. I see more than a physical aspect, I see an adventure of the spirit. Exactly as was the case with the alchemists. The sound reflects a will of existence, a direction towards a goal. (Dumitrescu 2002: 28)

Sound is a living phenomenon and the composer, by disclosing its intrinsic kernel becomes the catalyst for an ensuing sonic dramaturgy. It is unfortunate that timbre is poorly represented in many musicians' education, as it is considered peripheral. Timbre is much more than the mere identification of a sound-source or a class of sounds. It is closely related to the dynamic temporal evolution and materiality of sound, and therefore to sonic matter itself.

I think the multidimensionality of timbre is disclosed in music when a more elusive approach is at work. An *acousmatic* approach to timbre can be far more interesting than the conventional combinatorial treatment of individual sounds or sound classes as distinct colours. "Harmony is actually an emergent quality of timbre" (Christensen 1996: 75). Aspects of this can be found in certain spectral composers but I think few have taken this idea to its utmost conclusion. They also appear in certain aspects of radical electronic music. These are the two main sources of a genuine interest in the hidden matrix of timbre.

Composition is the shaping of sonic phenomena while disclosing their intrinsic forces. In that sense it has an additional meaning; to allow emergent sonic qualities to reveal themselves.

Musicians are well acquainted with the idea that two tones

> sounding simultaneously form a new whole exhibiting a quality which is more than the sum of the qualities of the individual tones taken separately. Such a quality might also be called an emergent quality. We depend upon this quality to identify harmonic intervals, and to classify them as consonant or dissonant according to their varying degrees of qualitative roughness. Tonal simultaneities built up of one or more of these intervals have been called "chords", their emergent qualities can be called "chord color", and the process by which the independent tones combine their effects to create this quality has been called "tonal coalescence", or "chord fusion".
>
> (Wright and Bregman 1987: 64)

It is this emergent capacity that is of particular interest to me. Structure and form are seen as immanent and emergent capacities of sonic matter that are disclosed by an act of human will and spirit.

2.1.2 Sound Movement – Memory – Pulse

Music unfolds in our memory through movement. It is through motion that aural temporality emerges with distinct temporal shapes. Sound movement in music is the external contour in which all other aural dimensions unfold. It is the vehicle for the change through which sonic matter is structured in our memory. It is what makes the temporal structure of sonic matter perceptible as something immediate and transient.

> Movement and pulse are macrotemporal listening dimensions, creating the experience of time in the listening process. They represent two kinds of auditory awareness. Movement evokes the awareness of change, pulse the awareness of regularity. […] There is no distinct border between the microtemporal experience of a characteristic timbre and the macrotemporal experience of sound movement.
>
> (Christensen 1996: 14-19)

Therefore, *sound movement* defines *how* time is experienced through music and how music creates a sense of time. The closely interwoven

relationship between timbre and sound movement supports the assertion that sonic matter governs form. In that sense, we could consider *movement* the macroscopic shape of a given sound event, as something that grows from within. “The breast is rounded because it is swollen with milk” (Bachelard 1983: 119).

Anticipation/change, expectation/surprise are essential elements of sound movement in musical perception. The degree to which these pairs relate and operate creates distinct *lived temporal imageries* that can be described variously as endless nows, diffused time, goal-oriented time, metric, and spectral flow. Thus, the ambiguous and elusive nature of sonic matter unfolds through a temporal schema as movement. It is mainly through this schema, this temporal shell that makes it possible to penetrate our skin/our psyche and create experiential responses to the world around us.

2.1.3 Timbre – Localisation

As suggested previously, it is not uncommon to find spatial metaphors and spatial attributes in musical discourse. Let me start this section with two very basic perceptual tendencies. “When auditory perception is activated by a sound event, two questions are asked subconsciously; what is the source of this sound, and where is that source?” (Christensen 1996: 10). I will not explore the well-known discussions about the relevance of hearing and especially what is called causal listening to sustain life, or how those two questions are largely instinctual responses to our surroundings. “We can see in a very crude way how this ability was essential for our survival […] One needed to be able to differentiate between harmless herbivores and dangerous carnivores, predator and prey, friend and foe” (Wishart 1996: 129).

Beyond this seemingly natural ability it is more interesting to see how this innate mode of hearing has been incorporated into music making and listening. In other words, to examine the relationship between timbre (sound-

source) and localisation (position) in artistic practice. These two dimensions are perceived within a fraction of a second, hence they can be considered elemental factors of hearing. Furthermore, the capacity of omnidirectionality and the ability to locate and discriminate sound-sources in complete darkness make this auditory dimension of particular musical interest.

> While not nearly equal in precision, the auditory localization system has two attributes that the visual system does not have, a 360 degree scan and it functions in darkness. *Auditory perspective*, the perceived position of sound in space, is composed of important acoustic and psychoacoustic dimensions.
> (Chowning 2000: 3)

The notion of auditory perspective becomes even more intricate and refined when referring to the fusion, blending or juxtaposition of timbres. One's compositional approach to sound-sources and their localisation largely defines how distinct sound events are perceived; either as a mixture of sounds whose individual identities are identifiable to varying degrees, or as a juxtaposition of separate and clearly divisible sound sources. Localisation is a contributing factor to how certain sound-sources blend together or are perceived as separated and divided.

These two basic dimensions can have further implications for example for new staging strategies and as part of a composition itself, and not merely as a theatrical or other added element. Morton Feldman's *For Philip Guston,* performed at the Royal Academy of Arts in 2004, lasted four hours and eleven minutes and was played amongst Guston's paintings. It was a life's lesson in concentration, absorption and patience as the overall setting and the composition itself encouraged a certain focus on the *resonated space and the stretching of time.* In such performance conditions perceptual elasticity becomes apparent.

The overall setting could be described as something between performance and a total environment. I find this direction a very fertile ground for composers who want to avoid the worn-out convention of concert-hall performance, and create more intimate performance conditions or artistic settings. In my practice, I

have worked around this area through sound-installations and by performing in different locations and settings as an improviser. I tend to view these projects as singular events.

2.1.4 Intensity – Loudness

Intensity is the vehicle for focusing attention on a given sound-event. It is what actually makes auditory perception possible and is therefore considered a basic listening dimension. Its extreme intricacy and delicacy are manifest in the infinite gradations of intensity perceptible to the human ear, from the nearly inaudible to levels loud enough to cause physical pain. Intensity is not only strictly embedded with the identification of certain sound-sources and their temporal evolution in terms of loudness (amplitude envelope), it is also closely connected with the discernment of their magnitude and distance.

2.1.5 Distance

Distance is a spatial attribute. The auditory perception of distance is a composite of intensity, spectral content and reverberation that answers the question of how near or far a given sound-event is. The perception of distance discloses – to a great extent – the acoustic qualities of a given space. It is interesting to contrast auditory and visual distance.

> Visual space is experienced in the dimensions of height, length and width. Visual spatial orientation is limited by the borders of the visual field, but the auditory space is not limited in the same way. […] The impression of distance is produced by the composite sensation of loudness and distinctness, resulting in an approximate estimation of distance. (Christensen 1996: 11)

The threefold schema of distance-localisation-direction is the primary factor for perceiving space *through* sound and vice versa. Sonic matter travels in the form of propagated sound waves. “This wave bundle responsible for

hearing has also spatial boundaries" (O'Callaghan 2007: 25). In the visual field we distinguish objects according to their shape, size and localisation; in short perceiving them through *spatiality.* It appears that we do the same in the auditory field for *"aural objects"*.

> Such spatially bounded, travelling particulars are in certain respects surprisingly object-like. They can be created; they have reasonably defined spatial boundaries but persist through deformation; they survive changes to their locations and other properties; and they are publicly perceptible. To be sure, they make peculiar sorts of objects: their capacity to overlap and pass through themselves makes them stranger than most everyday objects. (O'Callaghan 2007: 25)

It seems helpful when discussing distance to conceptualise sound-events as object-like, though sounds are not objects but events. High frequencies diminish more rapidly than lower ones due to air friction and absorption. The predominance of high frequencies within a spectrum tends to underline *localisation* and distinct aural contours. "It should be noted that the effect of air absorption on the spectrum of signals above 10KHz at the ears can become distinctly audible at distances as short as 15m" (Blauert 1997: 126). In that sense, localisation becomes more "diffused" and "blurry" the further one gets from the sound-source. But nonetheless, as with visual perspective, there is still a sense of localisation as the sound-source converges and vanishes into a distant point.

The correlation between visual and aural discrimination of distance is clearly revealed when the notion of *auditory perspective* is taken into account.

> The auditory system seems to map its perceived information to the higher cognitive levels in ways analogous to the visual system. Acoustic images of great breadth reduce to a point source at great distances, as one would experience listening to an orchestra first at a distance of 20m and then at 300m, equivalent to converging lines and the vanishing point. Sounds lose intensity with distance just as objects diminish in size. (Chowning 2000: 2-3)

As I have already mentioned, the simultaneous, immediate and basic perceptual

questions are*: what* is that sound-event and *where* is it located? In that sense we create acoustic images by discriminating spectral content (timbres) and their location. Spectral content also loses strength and precision with distance.

> Timbral definition diminishes with distance of a sound from a listener just as there is a color gradient over large distance in vision. Therefore *perspective* is as much a part of the auditory system as it is of the visual system. It is not surprising that the two systems should have evolved in a way that avoids conflict of sensory mode comprehending the external world since many visually perceived objects can also be sound sources.
>
> (Chowning 2000: 2-3)

There are instances in which spectral cues rather than loudness are favoured in order to discriminate distance. Referring to an interesting psychoacoustic experiment, Chowning (ibid.: 4) reports that a listener, knowing through experience that the difference in timbral quality between a loudly or softly sung tone reflects vocal effort, is more sensitive to spectral cues than to intensity.

The same experiment showed that reverberation has an important role in the perception of a louder sound as more distant. “The intensity of the reverberant energy in relation to the intensity of the direct signal allows the listener to interpret a cue for distance” (Chowning 2000: 5).

Thinking in terms of distance-localisation-direction, allows a composer to be more aware of a variety of staging settings besides the usual concert-hall presentation. In addition, awareness of the high dimensionality involved in auditory perception discloses to the composer an intricate set of possibilities that go beyond the combinatorial logic of notes and instead focus on sonic phenomena and their perceptual lived reality.

2.1.6 Direction

Closely related to the perceptual dimension of distance is the estimation of the direction of a given sound event. This listening dimension informs us about the sonic trajectory of a sound-event in space. We localise sounds between pairs of

angles: in front or behind us, left or right and high up or close to the ground. The primary factors for an estimation of direction are time, intensity and spectral content.

> Spatial hearing is the result of accurate perceptual processing arising from the comparison of the sound signals arriving at each ear. The spatial omnipresence of sound gives rise to infinitely variable and multi faceted experience. Listening draws the world into the mind, contrary to vision, which has a tendency to draw the mind out in the world. Vision often dominates hearing, reducing sound events to concomitant phenomena in a visual space (Fredens & Fredens, 1991). As such, the full and intense presence of auditory space is experienced with eyes closed.
>
> (Christensen 1996: 11-12)

The perceived location of sounds poses some interesting questions. Where are sounds *actually* located? And are they located *at* or *near* the sound source? Or instead are they perceived *as if they were located* within the instantaneous motion from sound source to listener? Such a discussion helps us define actually *if* and to *what extent* the auditory experience is spatial or not.

> […] if auditory experience is not systematically illusory along two critical dimensions, then sounds are located at or near their sources. The widely accepted wave understanding of sounds implies, however, that sounds exist in the medium that intervenes between sources and perceivers, and it implies that sounds travel through or take place in different parts of the medium over time. The wave account of sounds, I shall argue, therefore implies that auditory experience involves two radical illusions: an illusion of location and, perhaps surprisingly, an illusion of duration. (O'Callaghan 2007: 30)

According to O'Callaghan's discussion it appears that the mainstream assumption that sounds exist and are perceived as they travel through a medium, involves the illusions of location and duration. If that is the case, then sounds are located *at* or *near* their sources. Here again we see the strong connection between sound-source and localisation. Even without the precision of vision's locational estimation, auditory perception provides information about the relative position of sound events. One of our simultaneous immediate

acoustic experiences is that sounds occur *at* some distance and *in* a particular direction.

> Audible objects and events have audible locations because their sounds have audible locations. […] My phenomenological claim is that we experience sounds, in a wide range of central cases, to be located in the neighborhood of their sources. When we do not, as when a sound seems to 'fill a room' or to 'engulf' us, this is not a matter of the sound seeming to lack location. Rather, the sound auditorily appears to occupy some larger portion of the surrounding space or to be 'all around'.
>
> (O'Callaghan 2007: 33)

The widely accepted view that considers sounds as travelling towards us, rather than as located in a particular place stresses the transmission of sound waves. But sounds are not heard to travel through the air as so described. They have causal sources in particular locations and are produced or generated at those locations (see ibid.: 36).

In aesthetic terms I could observe that musical sounds described as "atmospheric", "diffused", "immersing", "absorbing" tend to have this quality of 'filling a room' or 'engulfing'. This does not mean that they lack location but rather that they appear to occupy more space or to be 'all around'. This particular phenomenon of immersion is mainly at work in electronic music that emphasises this aspect or the aspect of forming a continuum with the environment and evolving renewed in every listening, or in instrumental music that focuses on the internal nature of sound and is relevant to what Horatiu Radulescu mentions in the introduction "you forget the technique and you get into a special atmosphere, a special state of sound" (Radulescu in Gilmore 2003: 107). The relationship between musical sound and space can be further disclosed according to the dimension of volume and size or magnitude of sonic matter.

2.1.7 Magnitude

Magnitude can be defined as the description of a sound-event in terms of its

apparent size and/or the size of its source. Auditory estimation of the largeness or smallness of sonic matter depends heavily on the intensity, duration and the frequency content of its spectrum. Low frequencies tend to be perceived as larger, expanding and full, due to their longer wavelength, in contrast higher frequencies with shorter wavelengths occupy smaller areas of physical space and tend to be absorbed faster.

Magnitude "increases with the intensity and duration of a sound, and is inversely proportional to its pitch" (Hollander & Furness 1994: 159). An auditory magnification occurs according to the intensity and duration of a sound, especially when low frequencies predominate. All sounds have size, even if in common perception this is rarely addressed consciously. There is a subconscious imprint on our auditory perception that associates low-pitched sounds with large objects or animals and high-pitched sounds with small ones (see Wishart 1996: 191-192). But this association rarely views magnitude as an important aspect of sonic matter. Nonetheless the auditory fact of size remains.

> Mechanical sounds like a cough of a furnace igniting, the screech of deforming metal, the hum of a turbine coming up to speed, and the thrumming of the wires with the approach of an electric train, all have an "extent" to them. More natural sounds, such as the sounds of wind, rain, ocean waves, and the creaking of trees under the weight of snow, also have size, and in some sense shape as well.
>
> (Hollander & Furness 1994: 157)

The above quoted sound-events are distinct sonic phenomena with more-or-less clearly defined magnitudes. A more diffused and vague kind of auditory magnitude can be observed in the resonances of buildings and other surroundings, perceived as an aural, at times barely perceptible, background. It is well known that low frequencies travel long distances (earthquake, thunder, sea's rumbling) and fill empty spaces. Working with these sonic attributes can be even more telling when experienced as recorded sounds in the immediacy of a music studio.

Intensity is a primary factor for apprehending magnitude. Human hearing is able to detect a vast array of intensities. Aural magnitude is perceived as if the

sound-events were coming towards us or even confronting us, while small scale sounds are intimate and calling for close attention as if they were inviting us to listen to them closely.

2.1.8 Shape

Sonic matter has a continuously changing shape based primarily on initial transients and the overall evolution of intensity as well its spectral content. As an attempt to explain the dynamics of sound-shapes this has been described as spectromorphology[1] (Smalley 1997: 107). It appears that the amplitude envelope plays a critical role for perceiving the temporal evolution of an auditory shape as well as the frequency and intensity fluctuations of its spectrum.

Hence the trajectory from *non-sound* to *sound* can be described as a complex event that defines a sound-event's temporal contour. It is well known from Pierre Schaeffer's early research that when the onset traits of an instrumental or other recognisable sound are removed or destroyed, the aural shape changes to the extent that the source becomes unrecognisable. Internal resonance and natural decay are also important factors – apart from the initial transients – for identifying particular sounds.

> Sound sources with internal resonance and natural decay (struck piano strings, struck bells) are also partly recognisable through this decay process and if it is artificially prevented from occurring, our percept may change (is it a piano or a flute?). (Wishart 1994: 45)

Essentially the dimension of shape is conceived through the metaphor of movement. It is the imprint on our memory of the sound's course that makes this auditory perception possible.

[1] There is a strong claim that the term morphology was coined by Goethe for his study of form in plants and animals while Μορφή / Morphé means shape in Greek.

2.1.9 Density – Permeability

Density refers to the degree of opacity or permeability of sonic matter. A solid, impenetrable sound-event suggests a dense spectrum without breaks or pores. It has concentrated acoustic energy that does not allow permeation. Opaque sounds tend to obscure and mask others that cross into their successive spectral zones. With dense sonorities there is spectral clash and collision rather than confluence and blending. These dimensions are especially relevant when listening to different simultaneous sonic strata and auditory streams. Hence the perceptual axis of density-permeability is vertical, as the auditory perception sinks through sonic matter in order to discriminate degrees of spectral opacity.

2.1.10 Spectrality

The listening dimension of *spectrality* means *searching out the deep structure of sound* as Horatiu Radulescu put it (see Hamilton 2003: 1).

It discloses a genuine interest in the facticity, "thingness" of sonic matter and also, emphasises its *composite* nature in our perceptual awareness. Sonic matter, apprehended as a physical phenomenon, that points beyond itself. In the same sense that our understanding of a person goes well beyond his or her physical appearance. There is not just a sense of utilising or manipulating sonic matter but a certain kind of *concentration* and *sacredness* towards it.

I define spectrality as the degree of harmonicity⇆inharmonicity of sonic matter and a higher order of structure within sound. It is the inner matrix that determines the degree of definite, indefinite or multiple pitches that might be perceived at once. This discloses the nucleus of forces within sonic matter; the depth of a spectrum with its "onset transients and decay characteristics of tone partials, fusion, micro-fluctuations, vibrato, formants, phase changes and other aperiodic attributes" (Butler 1992: 64). A sound-event is a composed resonant acoustic structure. It is this higher order listening dimension that has enabled musicians' not merely to compose *with* sounds but to compose sonic matter

itself.

2.2 Further Remarks on Auditory Perception

2.2.1 Perceptual Experience

It appears that in recent years composers are more interested in perception and cognition and take a more sharp and inquisitive path towards sounding processes e.g.: Horatiu Radulescu[2], Salvatore Sciarrino, John Young, Paul Rudy. This manifests itself through a keen interest in new levels and types of listening.

We need to be willing to move from focusing mostly on how a piece of music is made, to an understanding of the nature of auditory perception and the experiential nature of listening and music-making itself. In that sense, I find the work of Francisco López, and Lionel Marchetti – amongst others – particularly relevant. Leonardo Da Vinci in his notes gives an interesting insight on the subject:

> I shall not fail to include among these precepts a new discovery, an aid to reflection, which, although it seems a small thing and almost laughable, nevertheless is very useful in stimulating the mind to various discoveries. This is: look at walls splashed with a number of stains or stones of various mixed colours. If you have to invent some scene, you can see there resemblances to a number of landscapes, adorned in various ways with mountains, rivers, rocks, trees, great plains, valleys and hills. Moreover, you can see various battles, and rapid actions of figures, strange expressions on faces, costumes, and an infinite number of things, which you can reduce to good, integrated form. This happens thus on walls and varicoloured stones, as in the sound of bells, in whose pealing you can find every name and word you can imagine. (Kahn 2001: 35)

[2] Horatiu Radulescu : Brain and Sound Resonance – The World of Self-Generative functions as a Basis of the Spectral Language of Music. 2003. New York Academy of Sciences.

It would not be an exaggeration to suggest that a listener is a vital part of the sounding process itself (therefore the importance of perception and cognition); this is the reason for the plethora of different responses to a given piece of music. Someone should be willing to compose anew by listening!

My approach is to emphasise the interactional aspect of human auditory perception since

> the natural dimensions of categories (perceptual, functional etc.) arise out of our interactions with the world, the properties given by those dimensions are not properties of objects *in themselves* but are, rather, interactional properties based on the human perceptual apparatus, human conceptions of function etc. (Lakoff & Johnson 1980: 17).

It should be noted that while vision has dominated philosophical work on perception, experience and the mind, there is an increased interest in the auditory as a "distinctive variety of awareness whose features distinguish it from vision" (O'Callaghan 2009: 1).

Creative musicians know by instinct that sound creates its own distinct awareness but this cannot stop them thinking about its nature and characteristics. Finding themselves – as always – between phenomena and noumena, between the immanent and the transcendent, between the cruel real substance of sound and their thoughts on what constitutes artistic development, renewal, failure and realisation. Sound – a small animal almost everywhere nowadays – appears recognisable by everyone but equally unknown to anyone.

2.2.2 Acoustic Events and Auditory Streams

The seemingly simple question: "what is a sound?" is fundamental for composers and musicians, as it is the primary ground for understanding sound as an undivided composed acoustic structure in relation to our perceptual interaction with it. Compositional theories based on pre-conceived schemata tend to enslave sound into a parametric mind-frame without taking into account the intricacies of auditory perception and cognition.

> What sort of thing is a sound? Science has taught that sounds are waves. Waves, then, are what we hear according to the predominant view of sounds. Philosophers, however, often have grouped sounds, along with colors and tastes, with the sensible or secondary qualities. […] According to a third line of thought, it has recently been suggested that sounds are a certain kind of audible event. This view is motivated by several arguments in the phenomenology of auditory experience which indicate that sounds might be neither waves nor sensible qualities. (O'Callaghan 2009: 1)

We experience sounds as temporal "creatures" through movement, motion and change. Their shape is embedded with duration and an interval of time and could be described as objects whose sonic form unfolds and persists through time, in contrast with visual objects that can be described as "static" with fixed and "unchanged" spatial boundaries.

> Sounds as consciously experienced thus are naturally taken as the bearers of audible qualities that persist through time and survive changes. Sounds, therefore, are best understood as particular individuals and not as repeatable properties. (O'Callaghan 2009: 2)

This characteristic of un-repeatability gives sound an event-like entity. Sound refers to some physical cause and its experience; it can be viewed as a certain kind of act that is better described as 'sound-event' rather than as wave-motion or as something that an object possesses.[3] That inevitably leads to an understanding of sound-matter as something transient and palpable. It is no coincidence that such descriptions could stand as metaphors for different natural phenomena. Sound-events always happen somewhere, sometime, and are the

[3] For a detailed description on these three theories (Property View - Wave View - Event View) of sound see Casey O'Callaghan: Sounds and Events in *Sounds and Perception: New Philosophical Essays* Edited by Matthew Nudds and Casey O'Callaghan p.26-49. This essay based on a fresh reading of Aristotle develops an interesting and fertile description of sounds as events.

objects of auditory experience. In my view and ontologically speaking sound-events resemble the transient and event-like character of weather.

But what happens when many such sound-events occur simultaneously as is the case in many acoustic environments, and especially in music? Do they keep their distinct event-like quality, and in what way?

In order to attempt answering such questions, we need to distinguish between sounds as acoustic events and their perceptual mental representations. A recent description of our auditory system is Albert Bregman's 'Auditory Scene Analysis'.

> (…) The word "sound" refers indifferently to the physical sound in the world and to our mental experience of it. It is useful to reserve the word "stream" for a perceptual representation, and the phrase "acoustic event" or the word "sound" for the physical cause". (Bregman 1999: 10)

Based on the gestalt principles a] *Proximity* b] *Similarity* c] *Good Continuation and Completion* d] *Context* e] *Belongingness* f] *The Perceptual Field* g] *Innateness and Automaticity*[4] the theory of auditory scene analysis describes perceptual mechanisms for the segregation of distinct auditory streams in manifold acoustic environments. Furthermore auditory scene analysis can be described as the task of distinguishing sound streams "in the presence of interfering signals and background noise. Streams serve as the locus of binding for particular audible qualities, survive changes, persist through masking, and co-exist with simultaneous streams" (O'Callaghan 2009: 2).

Through these principles it is clear that we perceptually group distinct sound-events, segregating them into auditory streams. This is described in the same theory as *primitive segregation,* an innate and subconscious ability that exists in our auditory perceptual system as a result of the relative constancy of our sonic environment and does not require conscious learning and attention.

The ability to segregate streams through *schemas* is described as a learnt and conscious strategy that evolves and develops through personal

[4] For a detailed description see Albert Bregman: Auditory Scene Analysis p.196-203.

experience and learning. Innate and learnt schemas coexist; they are both auditory processes "concerned with the decomposition of mixtures of information" (Bregman 1999: 397). In short, the innate segregation process "employs neither voluntary attention nor past learning" (ibid.) while schema-based segregation employs both.

2.2.3 Auditory Organization and Music's Sonic Fabric

In music, different organisational dimensions coexist. From the simple, two-dimensional (e.g.: a simple melody) to the more elaborate; the depth/ permeability of sounds, directionality and movement through different speeds, net-like structures, soundmasses, polyphonic multi-layering, etc.

The simultaneous and sequential structures in music correspond to the basic horizontal and vertical axes in auditory organisational schema.

> The choice of the metaphor of a woven cloth implies that the woof and the warp are more than merely dimensions of the music; rather they are organizations that hold the music together in the same way that fibers hold a cloth together.
> (Bregman 1999: 456)

The important point here is that we can perceive this holding together as a whole while simultaneously perceiving its individual components as they change over time. As previously suggested, musical perception is elastic and operates on many levels.

How do we group sounds together, when what we receive in our ears is a composed mixture of their sounding effects?

> It appears that our auditory systems solve the problem in two ways, by the use of primitive processes of auditory grouping and by governing the listening process by schemas that incorporate our knowledge of familiar sounds. (ibid.: 641)

Such ideas attempt to describe any underlying organizational principles that might govern our auditory system when listening to music independently of

particular genres and musical styles; and here lies their relevance.

Musical Scene Analysis offers interesting insights but is limited to examples from the classical repertoire. We should be aware that the experiential aspect of listening goes beyond a mere analytic understanding of our auditory system. Our conscious and subconscious layers of activity are unique imprints of our lives, which go beyond any general theoretical schema. But as human understanding works both with logos and imagination we should be able to accept both as our own condition in the world. The questions that interest me are: What differentiates everyday auditory perception from listening to music (even when it uses everyday sounds and noises)? And how does musical form imprint in memory?

> […] music often tries to fool the auditory system into hearing fictional streams. In natural environments, the principles that govern auditory scene analysis have evolved to build perceptual representations of the distinct sound-emitting events of our environment: the wind, a person talking, the train off in the distance, and so on. There are individual events in music too, […]. However, music does not always want these to be the basic units of experience. […] A set of different musical instruments may be used to create a chord or some other composite sound that is meant to be heard as a global whole. (Bregman 1999: 457)

Music is created both with distinct sounds and by composites of sound; it wants us to perceive something more than just distinct acoustic events creating instead the conditions for hearing fictional streams. This tendency of going beyond habitual hearing is one of the main concerns of composers and musicians that work with acousmatic or elusive sound-worlds avoiding clear-cut and easily categorisable percepts (e.g.: Iancu Dumitrescu, Horatiu Radulescu, Francisco López, the late work of Luigi Nono, and Salvatore Sciarrino amongst others). Here lies the creative friction with our innate and learnt auditory schemas as well as with the historical condition of sonic matter. Music “cannot be divorced from the medium of sound and enters into our experience as part of an immediate concrete reality; it impinges on us and in so doing it effects our state” (Wishart 1994: 16).

Discussing the tendency of going beyond habitual hearing and searching for new levels and types of listening calls for mention of Schaeffer's four modes of listening.

Écouter defines the mode which gathers information about the cause/source of the sound. It is the most common as it is an innate perceptual act concerned with causality that helps us in experiencing, learning, and acting in the world.

Comprendre is listening to sounds within a system of signs for semantic and communicative purposes. It is as common as the first mode, as it relates to the way one listens to a language; it describes the process of extracting meaning within a system of aural signifiers be it a natural language or a musical genre.

Ouïr is described as the most elementary level of auditory perception; "one passively "hears" many things that one neither seeks nor listens to (*écouter*) nor understands (*comprendre*)" (see Chion quoted in Kane 2007: 18). This mode of listening is an overall and passive reception of the sounds that reach one's ears without any further selection, attention or understanding.

Entendre is the mode in which one attends, selects and focuses on the intrinsic attributes of sounds. It is "according to its etymology, to manifest an intention to listen, to select from what we hear (*ouïr*) that which particularly interests us, to effect a "qualification" of that which we hear" (ibid.). While the first two direct their attention to extra-sonic aspects of the aural sign the last two occur at the moment when the "sonic sign has been reduced to the sphere of pure immanence" (ibid.).

This pure sonic immanence is the perceptual result of what is described as acousmatic reduction. This reduction emphasises neither the context in which a sound occurs, nor its actual physical cause, but instead, the activity of hearing itself.

> Perception is not a purely individual phenomenon, since it partakes in a particular kind of objectivity, that of shared perceptions. And it is in this objectivity-born-of-inter-subjectivity that reduced listening, as Schaeffer defined, should be

situated. (Chion 1994: 29)

Are there any inter-subjective auditory dimensions in music? Different levels of sonic organization interact in music to form a total composition or performance as a single unit. For the purposes of this study, the critical point of auditory organization is that we perceive the emergent properties of composites of sound according to the simultaneous and sequential temporal axes. These two organisational dimensions give rise to certain perceptual groupings "Sequential grouping creates rhythms and different aspects of melodic form. Vertical organization gives us not only the experience of chords but also other emergent qualities of simultaneous sounds, e.g.: timbre, consonance, and dissonance" (Bregman 1999: 458). Automatic (innate) and schema-based processes cooperate for the segregation and integration of incoming auditory events. Source recognition and common source "provides a sense of identity that endures for some period of time" (see ibid.: 460), achieved by the segregation and recognition of a timbre in a dense mixture or the integration of a composite of sounds in a unit emanating from the same location.

It seems that questions regarding attention are necessary as listening to music involves attention. What is the role of attention then in selecting certain structures of the musical surface and its emergent properties? Is attention something constant and uniform or does it fluctuate according to different sonic attributes? Does attention play a selective role in audition? To what extent does it shape our mental representations and experience of music?

> A key process in music listening is the way we select certain things from the mass of information that comes to us as a musical surface. As we listen, our attention fluctuates through the many paths of this surface. What we remember, what gets stored away for future comparison with later moments in the surface, depends to a great extent on what we have attended to in listening. There are two basic kinds of attention. Automatic attention seizes upon striking or salient features of the incoming information. This kind of attending is involuntary and under little influence by the conscious processes of the listener. Willful attention, by contrast seeks cognitively important

> features of the information flow which are determined by what we expect to hear. This kind of attention is involved in following the line of a particular instrument in a complex musical texture. In this case attention is guided by *knowledge structures* that have been developed through experience. These important structures of memory and comprehension are what we have been called mental schemata.
> (Bartlett, 1932; Neisser, 1976; Sowa, 1984; quoted in Stephen McAdams 1987: 23-24)

Attraction and repulsion forces between different sonic elements and structural levels determine the emergent properties of our perceptual organization and its impact on our memory. There are no pre-determined perceptual paths to follow in order to apprehend and perceive musical form. The more experienced a listener is, the more perceptual attentive capacities are available to him/her for a given musical experience. Attention appears to be closely related with awareness that usually is the result of concentration and close attention.

SONIC DRAMATURGY

(Thoughts on Composing)

I WORK WITH THE SHAPE
of spirit
moving the matter
in my hands;
I
mold
it from
the inner matrix.
Even a crow or fox
understands.
Michael McClure

3. Sonic Dramaturgy
3.1 Sonic Dramaturgy versus Ars Combinatoria

Μεταβαλλόμενον αναπαύεται
Ηράκλειτος

Every new object, well contemplated,
opens up a new organ of perception
within us.
Goethe

Composition is about shaping sonic phenomena. I prefer to use the term sonic dramaturgy, not only because it reflects my own work better, but also, because it describes a specific compositional attitude and approach. It emphasises that I work with sonic matter itself (ηχητική ύλη) and I approach the art of music beyond the combinatorial and procedural compositional paradigm.

It is not surprising that with such an approach the *systematic* and the *methodical* has been emphasised to different degrees in art making and under different stylistic names. From Ramon Llull's combinatorial system of letters (Zweig 1997: 23-24) up to John Cage's procedural work with *I Ching* (in fact an ancient example of combinatorial art) to Oulipo writers (ibid.: 24-27) and today's generative computer art works, it appears that the *permutational* as a creative strategy is the established mode of thinking and working. The search for establishing formal procedures is not just a strong tendency but a fact amongst art practitioners. With music this is much more evident as "with its abstract

notation, lends itself directly to recombinancy" (ibid.: 23) and formalisation. "The process of increasing rationalisation in the modern age, can indeed be applied to large parts of music theory since the Renaissance" (Clark and Rehding 2001: 6) and this trajectory was based to a great extent on a naturalistic approach to sound that was the result of the rise of the scientific methods and natural sciences. The combinatory/permutational approach appears closely related with a music theory that has prioritised procedural logic and naturalism.

> Descartes – who was influenced by Ramon Llull – begins his *Compendium musicae* (1618), with a terse programmatic statement: 'Its object is sound'. With only slight exaggeration one could claim that these four words sum up the impact of the scientific revolution on music – the change from music as a divine force to music as a material phenomenon. As the latter, it could be subjected to scientific scrutiny; music theory turned particularly towards the mathematical and physical sciences as well as physiology. (see ibid.)[5]

The question of how to infuse the written page with a creative strategy that goes beyond procedural thinking is a constant quest for disclosing sonic matter from the confines of combinatoriality.

Here one finds the significance of recording and its liberating force to an epistemology that conceives form as an aspect of sound. Hence, I am pointing beyond a permutational approach to an aural philosophy of discovery that places the manifold before the formal, through constant perceptual and cognitive feedback loops.

In such an approach the unconscious and conscious mind have equally important roles. "The unconscious has the important property of being manifold" (Hadamard 1996: 23) and plays a central role in any form of invention or discovery. Therefore creativity and invention are manifolds in that they cannot be explained by their constituent parts or by how those parts relate and operate.

[5] Max Weber in his study 'The Rational and Social Foundations of Music' (1958) discusses the fixing of intervals as the basis for a uniform musical culture and the role of the Western European tempered scale as a fully rationalised system.

In other words, the manifold that *is* before the formal is the act of human will and spirit upon sonic matter. Sonic matter is the unconscious of form.

I am primarily interested in spectral confluences and collisions that disclose the nuclei of force of sonic matter. My output consists of fixed media, scores, improvisational performances and installations. Thus I consider it a manifold.

In addition, the notion of the manifold relates to uncertainty. It could be easily verifiable to suggest that a joyful uncertainty is contained at the core of the aesthetic experience. It is the dimension that connects the unknown with the clarity of mind and hearing. It is the process of disclosing the sensuality and enigmatic propositions of sound's tactile aural traces by avoiding pre-packaged and commercialised experiential schemata. The manifold uncertainty is the creative axis of a continuous feedback flow between human mind and sonic-matter that points beyond itself.

In recent years, the vibrating membranes of microphones and loud-speakers have told infinite stories of micro-universes; sounds that dissolve into their molecular parts; sounds as aural molecules; sonic mosaics ambiguous and elusive which nonetheless invite and demand clarity of listening. The ontology of sonic matter is nothing else but the capacity to penetrate our skin/our psyche and create experiential responses to the world around us. And this is where sonic dramaturgy begins.

3.1.1 Sonic Matter – Structure – Form

One of my primary aims is to disclose some ontological observations on sonic matter and composition, hence the emphasis between sonic dramaturgy and musica combinatoria. Composition is the shaping of sonic phenomena. It is the unfolding of their inner forces. In addition, composition is about *temporalised space* and *spatialised time* (see Bértola 1972: 27) through sound.

Everything begins with the interaction established between composer and sonic matter through the act of listening that occurs in every compositional

sounding process.

> The composer as a listener is the correlate of the composer as producer: in order to produce music, an act of hearing is necessary, whether it be the "inner hearing" (the silent writing situation) of pure instrumental music composition, or the "concrete hearing" of electroacoustic music composition".
> (Vaggione 2001: 59-60)

The same act of hearing applies to improvised music. In addition, it is necessary to notice that when working with computers (computer-generated and computer assisted composition) a strong sense of interaction occurs between composer and computer, in such a way that – in most cases – the composer could be considered to be also the *performer* of the composition.

In that sense it is justifiable to say that the overall shape of the work emerges from multiple levels of interaction. By interaction I mean the creative friction between composer and the material at hand, as well as the interaction between particular sounding structures.

It is my view that a composer acts as a catalyst who helps sonic matter to be actualised in one of its possible potential states. In that sense, the compositional process appears as a bipolar perceptual movement, as a manifold of thoughts and decisions. In the end, different structural levels operate, evolve and overlap resulting in an overall form.

I regard sonic form as an emergent property, not as something predefined. In most of the works to be discussed the use of micro-compositional strategies allows global morphological properties of structure to emerge from local conditions in the sonic matter (see DiScipio 1994: 4). Composition *above all* is to create those auditory perceptual conditions for sensitising one's hearing capacities. There is a common assumption that because one composes or paints, what is necessarily wanted is a piece of music or a picture (see Feldman in Friedman 2000: 78). The ultimate aim is awareness and integrity through sound.

3.2 Works

"Musical sounds are those that are felt to be particularly rewarding as objects of aesthetic attention" (Hamilton 2007: 52). Hence there is an ontological distinction between sound and musical sound. Francisco López has put it rather eloquently when he says that music is an aesthetic perception, understanding and conception of sound (see López 1996: 1). Ultimately "dealing with aesthetic facts means dealing with qualitative experiences" (Arnheim 1996: 67). Therefore, listening and perceiving sonic matter as music means to listen to and apprehend a human intention *through* and *within* sound.

My quest for disclosing *values of intensity* and infinite gradations of sonic matter is displayed in the following selected works that encompass the period between 2003-2010.

3.2.1 Electro-Acoustic

3.2.2 Composition # 1: Inscape 5

Duration: 7'
2004

Inscapes is a series of compositions in which the primary concern is the timbral affinities and contrasts of sound. Each 'inscape' could be considered and experienced as an aural terrain with different perceptual and affective qualities. Their common feature is a focus upon articulated micro-sonorities and textural sound masses. Each 'inscape' defines its own distinct restraint and composed contour. The title was prompted by Gerard Manley Hopkins' idea of *inscape* as "species or individually-distinctive beauty" (Hopkins 1985: xxii). In addition, Edmond Jabés' verse: "enter into oneself, that is to discover subversion" (Jabés in Pape 1999: 58) suggested a connection between the interiority of sound and the interiority of the composer, which intersect in the act of listening. The *Inscapes* series started in 2004.

Inscape 5 works on the sounds' interior morphology and their external spatial movements within the stereo field. A directional intensity builds up from the very beginning as different sounds are vectorized in different speeds towards the final section. A forward spatial motion of sonic strata develops from an initial closed to a wider perspective. By shaping within and between the different sound-structures, a polyphony of shifting sonic planes emerges.

***Inscape 5* consists of three sections:**

0`00`` - opening: erratic noisy texture

0`53`` - sustained high-middle-low micro-modulated frequencies enter the aural space

1`25`` - spatio-spectral shaping of part of the foreground creating vectorized aural-traces

1`57`` - through frequency shaping melodic fluctuating textures arise

3`01`` - 2nd section; interplay of background-foreground shapes becomes apparent; micro-melodies/micro-rhythms occupy the aural field; splitting/colliding palindromic movements

5`43`` - 3rd section; chorus emerges out of the noisy texture, it is heard through micro-spectral shaping and ring-modulation, as a result appears in a continuous fluctuating vibrato

6`51`` - through frequency shaping/filtering of the spectrum the chorus fades away into the distance

6`56`` - pause/silence

7`00`` -

3.2.3 Composition # 2: INSCAPE 10 [9'33'']

INSCAPE 11 [2'20'']

Duration: 11' 53''
2005

In *Inscape 10* and *Inscape 11* I have worked entirely in a microscopic and

monochromatic way. Restricting myself to one synthesized microsonority a 'molecular aesthetic' of sound approach was almost unavoidable and ultimately welcomed. A wave-like motion became a prominent structural element for the unfolding of the sonic flow; the same goes for the arch-like changes between soft and loud levels.

The overall auditory shape emerges from the continuous focus on the local microstructural transformation of the composed sound; the final commixture suggests a microscopic expansion/contraction movement, a structuring process beyond the cognitive separation of sound matter and the overall auditory form.

3.2.4 Composition # 3: Nekyomanteion

Duration: 13' 07''
2005

Nekyomanteion was prompted by the Nékyia rhapsody of Homer's Odyssey where Odysseus travels to Hades in order to hear an oracle for his continuing journey by the now-dead foreteller Teiresias. *Manteion* means a place in which one hears oracles and *Nekyo* refers to the dead. I found in this myth a genuine expression of issues concerning life and death. After seeing and listening to beloved dead persons, Odysseus finally hears Teiresias's oracle. What does it mean, actually? The only way to learn its meaning is to live the oracle through his journey.

The sound material used consists of synthesized, acoustic and found-sounds. Actually, my primary concern for this composition was to create a listening dimension that allows the listener to imagine the particular aural setting of the mythic situation. Through different layers, micro-textures, and spatial positions an aural movement is composed that, hopefully, creates a perceptual heightened awareness.

In addition, this work can be viewed as my personal reaction to what is happening today in the world, a seeming loss of respect for both life and death,

which has spread almost everywhere.

There is a palindromic movement between stasis and continuously evolving motion; the contrasted interplay between slow-paced sounds and a more directional, spatio-temporal unfolding. It is composed in stereo, exploring the space between the loudspeakers, while trying to evoke a certain kind of auditory perspective.

A wide spatial field is created by different movements across the horizontal plane that also expands in depth. The spectral dimension encompasses a wide-range of frequencies in the vertical plane through the different sonic layers. In addition, there is a continuous presence of pitch-based sounds that suggests melodic articulations and superimpositions.

The presence of multiple superimposed and shifted pitch strata creates a polymorphous acoustic space. Transparent and porous morphologies, in terms of density, intersect in a periodic and continuous manner with denser textures, while at times certain percussive, crystalline, pointilistic sounds arise on the surface of the aural flow.

There is a small degree of gestural activity. A more organic aural process is suggested, in contrast with other gesturally-oriented works that contain a high degree of intervention upon the material and usually exhibit abrupt articulations and faster paces (as in certain examples of ‘classic’ electroacoustic pieces). The flowing and fluid development suggests a natural process of growth and emergence; a constant oscillating spatial environment.

***Nekyomanteion* consists of a continuous, slow-paced sonic flow:**

0`00`` - opening: alloyed textures oscillating between different distances/ proximities that create a spatial depth; micro-melodic planes collide and superimpose within different durations; the vertical-horizontal and depth dimension emerges from the sonic directions within the aural stream:
constant/ascending/descending
left to right/ right to left

distance/proximity

3`44`` - a sustained melody arises amongst the aural flow with a clear ascending/descending contour; although the constant overall slow - pace continues and remains the same up to the end, the individual sonorities appear in slightly irregular speeds

6`30`` - human presence is suggested through-out the work with human voices/sighs/breaths that occupy different timbral and pitch spaces; from the start the fluctuating percussive sounds suggest and define the height within the spectral space as well giving a sense of restraint and unexpectedness to the sonic flow

8`31`` - a voice enters the aural setting; the climactic point of this suspended sonic flow is reached; the crucial encounter has happened

13`02`` - pause/silence

13`07`` -

3.2.5 Composition # 4: Childhood's Vertigo

Duration: 8' 56''
2006

Childhood's Vertigo deals with different sonic durations and speeds, and complex inter-modulated timbres. It aims to create a sense of extended time and continuity. Childhood is our first encounter with the world; a feverish and grand encounter that is re-visited whenever we dare to be astonished. It is composed in stereo and the sonic material is taken from a duo improvisation of vibraphone/voice (Thanos Chrysakis) and drums (Darío Bernal-Villegas).

It is based on time stretching and the superimposition of different durations and speeds of timbrally complex inharmonic sounds. A sound's slow-motion through time-stretching, makes its interior varying shape become apparent and more perceptible. I like to perceive this technique as equivalent to what is called 'long-take' in film-making in which a continuous and long movement of the

camera is used. Varying time-stretches can create a mosaic of shifting aural planes in constant motion. As a result, the intrinsic morphologies of the sounds are magnified, creating wide and detailed aural structures that shape the piece's overall arch-like shape. A momentum builds up slowly a sense of direction as if the sonic flow was moving along the arrow of time.

The coexistence of contrasted sonorities and speed-transitions create a turbulent fluid state. The gestural dynamic aspect of the instrumental sounds, in addition to the smooth speed transitions, gives a sense of goal, growth and expansion to the overall shape, while the interwoven interior of each sound is blown-up, magnified and extended.

The emphasis is on creating aural vectors with different magnitudes, speeds and directions. The overall motion has a strong structural importance as it is through the acceleration and proliferation of the density of sounds in the middle of the compositional space that the overall form gains its dynamic character.

***Childhood's Vertigo* consists of three sections:**

0`00`` - opening: a constant-speed alloy of inharmonic textures; a spread-out,diffused frequency space with a convoluted aspect unfolds

2`45`` - 2nd section: smooth transition to an acceleration and proliferation of sounds; aural vectors emerge with intensity and directionality building-up a turbulent state and a vibrant sonic flow

4`57`` - beneath this turbulent state another slower - stratum starts to appear

5`27`` - between these strata a kind of "rivalry" starts to establish as the slower layer gains in intensity

6`00`` - the slower stratum comes to the surface while a wider, diffused open sonic space appears

8`54`` - pause/silence

8`56`` -

3.2.6 Composition # 5: A Scar In The Air

Duration: 31’ 49’’
2008

A continuation of the *Inscapes* series; a set of compositions based on the structural and aesthetic capacity of sonic matter; a confluence and at times collision of composed and decomposed sound-spectra, based on field-recordings, synthesized and acoustic sounds.

In this piece I wanted to create a deep sound-world (deep in the sense that something is coherent (has its internal logic) while at the same time remains enigmatic). It was pre-designed for having a 30+ minutes total duration while each separate piece/section would have lasted between 4-6 minutes.

Focusing on the ideas of permeability and opaqueness I have worked with dense and less-dense sound-structures. Structurally it focuses on the pair continuity/discontinuity; as it is flowing effortlessly from one piece to the next forming and dissolving in a continuous aural motion with some sudden changes it can be viewed as different long-takes with some abrupt/sudden montage changes. *A Scar In The Air* contains the *Inscapes* between the numbers 24 – 29.

3.2.7 Composition # 6: Subterranean Sky

Duration: 46’ 42’’

Subterranean Sky consists of five movements composed between November 2009 – August 2010. A knotted commixture of sonic strata that is based on field-recordings, synthesized and acoustic instrumental sounds. The composition describes the macro-shape of a ‘sky underneath/within’ an agglomeration of aural forces, through their attraction and repulsion structural states that undergo throughout the piece. The pair expansion/contraction informs the layout of a

tide-like motion that coexists within a more directional sound-movement of the sonic admixture.

3.2.8 Instrumental

3.2.9 Composition # 7: Into the Distance

Duration: approx. 10 min.
2006

Into the Distance is a score-based work for solo bass clarinet in B♭. In contrast to the previous works – in which a direct interaction with the sonic matter takes place – the musical score can be defined as an intermediate state or a particular set of conditions for making a sound world happen.

It is justifiable to think that different kinds of representation also define different compositional possibilities. Notation defines to a large extent the aesthetic dimension of a work, in the same way that specific tools influence digital and electroacoustic music. The musical score can be described further as a plane surface that makes sound possible through performance. I view a score as a planar surface. An interesting question for musicians, is what kind of transformations might occur upon this planar surface. First is the *physical* space. It has four dimensions, three of space and one of time. Second is the musical *score* which is a plane surface with a horizontal, vertical and diagonal dimension and third is the *musical space* (see Hodges 2003: 92).

In this piece the planar surface of the score has been treated as a terrain in which possible spatial transformations could occur, creating a contour of cascading symmetries and asymmetries. The timbral identity of the clarinet relates to the predominance of the odd harmonics within its spectrum; the composition is based on the first five odd harmonics of the note E♭2 (two octaves below the middle c-C4). A focus on the timbral exploration and specific sonic identity of the bass clarinet is evident without fearing the melodic

possibilities and articulations of the instrument. The first five odd harmonics of E♭2 are: E♭2–B♭3–G4–C≠5–D5. These pitches function as an axis within the bass clarinet's different timbral regions. Palindromes were used in order to create a contour of flexible isometric aural zones.

1st section:

Bars: 25 3/8 → 49 2/8

2 → 25 2/8

2nd section:

Bars: 92 → 133 2/8

91 → 49 3/8

3nd section:

Bars: 133 3/8 → 156

Even if the piece could be divided into three sections, I prefer it to be conceived as a continuous flow. There is a certain kind of melodic drive that orients the music throughout with an equal concern for micro-modulations (with various types of vibrato, fluttering), and minute intonational gradations with eighth and quarter-tones. The whole registral space of the instrument is explored within smaller and larger intervallic spaces. The dynamic markings vary without establishing any stability of intensity except in the last section that appears quieter, with just a few bursts of loudness and an improvisatory tempo. In this last section the music becomes less dense.

3.2.10 Composition # 8: Passage Dangereux

[for Kate Ryder]

Duration: 5 min.

2008

–prepared and toy piano + soundscape + video–

Passage Dangereux title refers to Louise Bourgeois' mixed-media installation – with the same title – in which different objects found or made – chairs,

sculptures, tapestries, mirrors, cushions, bones and so on – are contained in cells within a large cage. Her sculptural environments and cells are captivating and can create strong associations and ideas. I have always found interesting and at times thrilling the way sculptors and other installation artists think and work in terms of materials, objects and their surroundings.

The title suggests a polyphony of suggestions and associations that I deliberately played with. I approached this music having in mind the cells of this specific work and wanted to create something that structurally and perceptually could evoke a similar sensibility. I approached the instruments as found objects to act upon them; as passageways from one place to another; as fragmented aural patterns; as an array of transitory passages of time.

I like also the idea of music works being performed in specific environments and sculptural structures, and I can imagine that this piece works better if performed inside – or as part of – a larger sculpture.

3.2.11 Installations/Environments

3.2.12 Work # 9: Encounters

Duration: ad libitum

2002-2003

Encounters is a multi-channel generative electronic soundscape conceived as a sound-installation for different places. It is written in the audio programming language SuperCollider version 2.2.16 and actually, it could be considered as an algorithmic composition.

Tristan Murail rightly has suggested that algorithmic music has not really left us with very many masterpieces; and the principal critique is that musical phenomena are not as easily reduced to a series of numerical data. (see Murail 2005: 233-244). Vaggione stresses the importance of composer-computer interaction with the following words:

> Music is not dependent on logical constructs unverified

> by physical experience. Composers, especially those using computers, have learned – sometimes painfully – that the formal rigour of a generative function does not guarantee by itself the musical coherence of a result. Music cannot be confused with (or reduced to) a formalized discipline: even if music actually uses knowledge and tools coming from formalized disciplines, formalization does not play a foundational role in regard to musical processes (Vaggione 2001: 54).

Sharing the above problematics I prefer to emphasise the direct interactive creative feedback flow between composer-computer and the actual acoustic result rather than the formal rigour which a certain sounding process might entail.

All the sound material is synthesised hence it could be said that each sound becomes a composed structure itself. Its overall open-form *emerges* from the spatio-temporal interactions and transitions of the different aural fields, in addition to the sonic qualities of the environment.

The main motivation was to work with the idea of *intersection* between the generative soundscape and the actual environment. The idea that music does not construct only time but space as well played a crucial role for creating a soundscape that regards the environment as important factor for its completion and apprehension. The frictions between those two elements, how the one influenced the other, were the primary concerns for its conception and realisation. It has been conceived with the possibility of different spaces and surroundings in mind.

In February 2005 this micro-textural self-organized soundscape was presented at Goldsmiths, University of London. It was placed in a room with large windows, so changes of the natural light could be seen by those who visited the venue more than once. Two squares in the middle of the room were constructed. The outer square consisted of four loudspeakers while the five chairs on each side represented the inner square. The listeners experienced a different acoustic perception of the spatiality of the sounds according to where they chose to sit. The sounds could dominate the space in volume, and at other

times could integrate with the sounds and resonances of the environment. Because the natural light changed throughout the day there was an interesting integration with sounds of the environment, but also with the micro-movements of natural light. In the evening darkness, sounds of the environment masked during the day started to unfold as the environment became quieter. Simultaneous perception plays an important part in the way we interact with our everyday surroundings. “We’re connected to the spaces that we live in by both a “pin-point focus of ordinary perception” and the “broad-focus of simultaneous perception”” (Hiss 1991: 3-26).

The complex ways that we respond to and are affected by different environments situate the locus between the perceptual-internal and the external space. The atmospheric qualities of various surroundings trigger affective and cognitive responses, and this is something important for musicians to take into account. It is in this framework that *Encounters* situates itself.

Sound-installations currently occupy a position between fine-art and sound-art; there are perhaps not too many composers involved in this practice, an area which contains many possibilities for bringing awareness of sound and space outside the confines of concert-halls. Through this practice new ideas could emerge about the way the music is composed and presented.

3.2.13 Work # 10: RoomMaze

Duration: ad libitum
2007

A sound-installation that was conceived and realised after an invitation from the Artpool P60 Gallery in central Budapest. Having at my disposal different rooms I’ve designed a mixed-media site-specific environment that was based on the notions of orientation/disorientation through a “sonic forest” or “sonic maze”. Furthermore working around the idea of the *Room* as something that extends beyond its physical boundaries; as every room not only influences its

inhabitants/visitors but is also influenced by them. In that sense, it extends beyond its physical properties and "expands" or even "contracts" according to their perceptual, cognitive or psychological responses/abilities. It was running between 10th and 21st of October 2007.

3.2.14 Collaboration

3.2.15 Work # 11: Phosphoros [7' 03'']

Work # 12: Sonoric Clay [7' 25'']

These works have been recorded as part of a series of electro-instrumental recording sessions between myself and Darío Bernal-Villegas in 2006. Aiming at exploring live-electronics with acoustic instruments in an improvisational setting while searching for an acousmatic dramaturgy of sonic and harmonic fields that oscillate between the spectral and the gestural.

***Phosphoros*:**

Thanos Chrysakis	Darío Bernal-Villegas
vibraphone, live-electronics, marimba	marimba

***Sonoric Clay*:**

Thanos Chrysakis	Darío Bernal-Villegas
inside/string piano	inside/string piano

The notion of collaboration through free improvisation has become an important and integral aspect of my own musical output. Some of the aspects that I found especially relevant are: its synergetic, interactional and performative nature, the listening attentiveness that demands, the spontaneous emergence of sonic structure and finally its closeness with the notion of a search for an 'active'

sound, as outlined above through the concept of sonic dramaturgy; a perpetual search for a sound that acts.

Summary

It is the thread of *sonic dramaturgy* that interweaves and connects the above works; all they disclose a quest for an ‘active’ sound as an agent of transformation, integrity and awareness and as a result ask for new degrees and types of listening. Ultimately this research is an enquiry into the structural and aesthetic capacity of the infinite gradations of sonic-matter beyond the dominant, and worn out musical categories of procedural and combinatorial thinking; the manifold character of the included works is evidence for this.

Their ultimate goal is seeking out a perceptive and acute type of listening based on an understanding of form through the notion of sonic dramaturgy (ηχητική δραματουργία).

List of included material:

1. CD 1

   [Inscape 5, Inscape 10, Inscape 11, Nekyomanteion, Childhood's Vertigo, Encounters (stereo_excerpt)]

2. CD 2

   [Passage Dangereux, Phosphoros, Sonoric Clay]

3. A SCAR IN THE AIR [CD]
4. SUBTERRANEAN SKY [CD]
5. DVD

   [Documentation of *Encounters* + *RoomMaze*]

Scores

1. Into the Distance [for solo bass clarinet B♭]
2. Passage Dangereux + electroacoustic part + video_DVD
3. Encounters [code]

APPENDIX 1

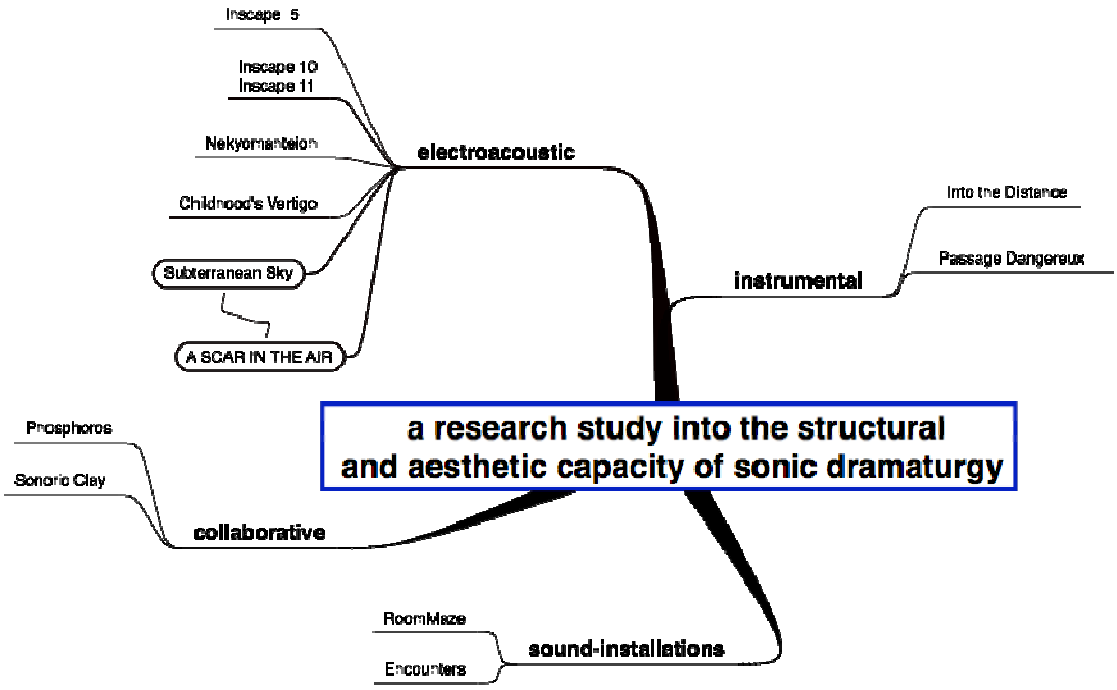

diagram of works

APPENDIX 2

Selected Activities between 2003-2010

Discography

Subterranean Sky [Aural Terrains, TRRN04012– 2010]

ENANTIO_DROMIA [Aural Terrains, TRRN0308 – 2009]

Instant–Cascade–Distant [Aural Terrains, TRRN0306 – 2009]

A Scar In The Air [Aural Terrains, TRRN0205 – 2008]

Palimpsesto [Aural Terrains, TRRN0202 – 2008]

Klage [Aural Terrains, TRRN0101 – 2007]

Distinctions

Nekyomanteion was received a Honorary Mention at the 7th International Electroacoustic Composition Competition MUSICA VIVA 2006 in Lisbon. The jury was constituted by Morton Subotnick (USA), François Bayle (France), and Miguel Azguime (Portugal).

Inscape 5 was amongst the selected works at the International Competition de Musique et d'Art Sonore Electroacoustiques de Bourges 2005 in the category œuvre d'art sonore électroacoustique.

Compilations

THE HMMM REMIX [LE SON 666 – 2007] (Montreal, Canada)

Bend it like Beckett [Art Trail – 2006] (Cork, Ireland)

Belly of the Whale [Important Records – 2006] (Massachusetts, USA)

On-line releases

Enantio_Dromia [Audition Records – 2010] (Spain)
(Live Performance at Espacio Vacío on 28th May 2010
with Wade Matthews and Darío Bernal-Villegas)
Errant Waves [test tube – 2005] (Portugal)
Inscapes [con-v – 2005] (Spain)

Installations/Environments

2009 Encounters……..Sound Installation
[Diapason Gallery, Brooklyn, New York]

2009 METAXU……12 min. Two-screen projection
[Artpool P60 Gallery – Budapest, Hungary]

2007 RoomMaze……mixed media – sound installation
[Artpool P60 Gallery – Budapest, Hungary]

2007 Patagonia……..mixed media installation. Idea-Soundscapes: Thanos Chrysakis, Sculpture: Eleni Froudaraki. [The Shunt Vaults – London Bridge, UK]

2005 Spamscape.....soundtrack for Pascal Dombis' interactive installation
[Château de Linardié – Sénouillac *and* Maison Populaire – Paris, France]

2005 Encounters .....a generative multi-channel soundscape
[Goldsmiths, University of London – Sonic Interactions Conference,
and BETA: Composition, Sound, Technology and Beyond, Liverpool, UK]

2004 Cartographies.....a generative multi-channel sound & video installation
[CYNETart -Festival for computer based art, Dresden, Germany]

2003 fluid trans-formations…… site-specific installation (one screen monitor)
[Wapping Hydraulic Power Station – 60th anniversary of spnm (society of promoting new music), London, UK]

Performances

2010

THANOS CHRYSAKIS + OLI MAYNE+JERRY WIGENS

29.5. Artus Studio, Relative (Cross) Hearings festival, Budapest – Hungary

28.5. Concert organized by Improv Est, Szeged – Hungary

27.5. Concert organized by Simultan festival, Timisoara – Romania

THANOS CHRYSAKIS + WADE MATTHEWS + DARIO BERNAL-VILLEGAS

28.4. Concert at espacio vacío, Madrid

THANOS CHRYSAKIS + WADE MATTHEWS

25.4. Concert at CRUCE, Madrid

23.4. Concert organized by AMEE [**ASOCIACIÓN DE MÚSICA ELECTROACÚSTICA DE ESPAÑA**], Valencia

22.4. Störung Festival 5.0, Barcelona

21.4. Concert organized by IBA (Improvisers of Barcelona Association), Barcelona

2009

Tetrás: Thanos Chrysakis (computer + electronics), James O'Sullivan (guitar), Oli Mayne (vibraphone), Jerry Wigens (clarinet) [Café OTO – London]

Improvising Trio: Thanos Chrysakis (computer + electronics), Oli Mayne (vibraphone), Jerry Wigens (clarinet) [Artpool Gallery – Budapest]

Improvising Trio: Thanos Chrysakis (computer + electronics), Oli Mayne (vibraphone), Jerry Wigens (clarinet) + quintet with Matthew Mitchell (saxophone), Béla Resch (double-bass) [Improv Est #7, Grand Café – Szeged]

2008

Improvising Quartet : Ken Slavin (violin, zither), Andrés Arregui (soprano sax), Thanos Chrysakis (computer + electronics), Darío Bernal-Villegas (percussion) [CRUCE Gallery – Madrid, Spain]

Solo set and improvising duo with Darío Bernal-Villegas (percussion) at Störung organisation of electronic and experimental music [Barcelona, Spain]

Improvising Trio: Thanos Chrysakis (computer + electronics), James O'Sullivan (guitar), Oli Mayne (synthesizer) [The Spirit of Gravity – Brighton, UK]

2007

Improvising Trio: Thanos Chrysakis (vibraphone + electronics), Sebastian Lexer (piano+), Darío Bernal-Villegas (drums) [The Shunt Vaults – London Bridge, UK]

2006

Improvising Trio: Thanos Chrysakis (vibraphone + electronics), Sebastian Lexer (piano+), Darío Bernal-Villegas (drums) as part of the LAM (Live Algorithms in Music) conference, Goldsmiths, London, 19th December.

Improvising Duo: Thanos Chrysakis (vibraphone + electronics) Darío Bernal-Villegas (marimba, bass-drum), Interlace Concert Series – Goldsmiths, Great Hall, London, 16th December.

Improvising Duo: Thanos Chrysakis (vibraphone + computer) Darío Bernal-Villegas (marimba, tam-tam), City University, London, 25th October.

2005

Improvising Duo: Thanos Chrysakis (vibraphone + electronics), Sebastian Lexer (piano+), as part of the LAM (Live Algorithms in Music) conference, Goldsmiths, London, 18th October.

Solo audio-visual performance at Maison Populaire, Paris, France

Texts

2011 *Not Innocent and Not Guilty,* The Book of Guilty Pleasures, pp. 38-39

[written 2009]

2009 *The Molecular Aesthetic of Sound*, Vague Terrain No15.

2006 *Spatio-Aural Terrains,* Leonardo Music Journal, Volume 16, pp. 40-42

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