Editorial: Sound and kinetics – performance, artistic aims and techniques in electroacoustic music and sound art

1. INTRODUCTION

On their web pages, Tate Museum in London has posted a short definition of kinetic art: 'Art that depends on motion for its effects.' In a sense then, music is a kinetic art, since sound consists of pressure waves propagated through air or another medium on its way to the listener's ear and attention. Music has always been concerned with the movement and agitation necessary for generating sound-producing oscillations, and everyone who has played an acoustic instrument knows the intimate connection between their movement and the more or less musical result. However, with electroacoustics, this has all changed, and there is no longer a necessary connection between movement and resulting sound, although we can imagine it to be so.[1] And many do, by mimicking musicians' gestures or what they perceive to be the musical expression of the recorded sound, and by inventing new controllers and instruments to better fit their needs. But in music, it is still the movement of wavefronts that matters most.

The study of kinetics is the study of motion and its causes, thus logically also including inertia – the absence of movement. Stillness has consequences, but when there is movement there are masses and forces to consider, motions and causes, materials and objects, as well as human biomechanical movement. The link to dance is obvious, and in addition, imaginary movement and the soon-to-be 30-year-old electronic simulation technology of virtual reality. It is possible to say that movement and/or the illusion of it is integrated in music to the degree that it is impossible to imagine music without it.

Grasping movement in the visual arts was arguably first attempted by the impressionists from the late 1800s – Manet, Degas, Monet and so on – however, a closer scrutiny of cave paintings from the palaeolithic period, such as those found in the caves at Chauvet-Pont-d'Arc, reveals an animation-like technique for capturing the physical dynamics of the depicted animals, so this crediting of the impressionists might have to be reconsidered. Regardless, it was with the more radical thoughts found among the Futurists half a lifetime later that the intention of capturing movement became an important identifier in giving form to the dynamics of the modern, industrial age. Umberto Boccioni's painting *The City Rises* (1910) and his sculpture *Unique Forms of Continuity in Space* (1913) are excellent examples. So is also Marcel Duchamp's *Nude Descending a Staircase, No. 2* (1912), which precedes Boccioni's sculpture by one year and is more than a little similar. The desire to capture dynamics was on the rise. More explicit and material-focused forms were created by Alexander Calder a few years later, in his series of mobiles from 1931 onwards, and a continuation of this mobile tradition is also found in the Stravinsky fountain (1983), where sculptors Jean Tinguely and Niki de Saint Phalle created whimsical play with water and moving objects outside Centre Pompidou and the music technology centre Ircam in Paris. Incidentally, the commission to Tinguely was particularly appropriate; to his credit he also has a string of kinetic sound installations.

As a term, sound art covers many practices and a plethora of artistic aims and intentions, ranging from simple explorations of materials and acoustics to use of culturally laden objects that carry their significance into cultural and political contexts, using sound as their vehicle. As a generalisation, one can say that sound art as a whole makes it easier for the artist to work with a broader artistic palette than in absolute music, interval- or non-interval based, where orchestration, balance, sound and structure are goals in themselves. Philosophically, this notion has arguably been underpinned by media theorist Marshall McLuhan when he stated that the qualities of one medium could only be expressed through another. With this statement from the 1960s, he introduced transmediality – art across different media – and opened the door for the slippery exercise of labelling art. With the absorption of digital code into nearly all sectors of modern society, demarcation lines between art genres have become less important, and the public increasingly accepts different mixes of expressions. Questions from the mid-1900s of whether 'art created by computer code and machines is really art' have generally disappeared, and the notion of what can be considered art is no longer defined by an educated art elite to the degree that it once was. This is noticeable also in the field of sound-based music, where the term itself is an admission of the fact that 'electroacoustic' describes only a smaller section of today's practices. Code and data can

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[1]This is what Murray Schafer refers to as 'schizophony' in his remarkable book *The Tuning of the World* (Schafer 1977).

be migrated from sector to sector, thus forming a new basis for the arts; a radical development of the tendencies of convergence that became noticeable during the mid-1990s, when it became clear that the processing *methods* for images and sound were much the same. We see this convergence today – studios and studio software for video and sound are very similar.

Availability of small-scale reasonably priced electronic kits for development in combination with the steadily increasing curiosity and competence among non-specialist user groups has invigorated a type of re-humanisation of technology in the arts. This can be seen as an immediate addressing of the concerns from the 1970s, where several composers argued strongly that the arts needed to embrace the new technology in order to remain relevant and carry their share of responsibility for social development. In rough terms, one can say that technology today is within reach of those who want it.

Technology is not only a thing, but also competence and practice,[2] and new trends in audience and visitor studies emphasise embodiment, participation, plus speculative archiving and citizen science. The selective input from non-specialists is valuable when accumulated. In practical terms, academia, independent art technology centres and the voluntary maker movement share an attention to the new type of connectivity and abundance of information easily accessed via the Internet. Compared to the situation from the early 1990s, the situation is radically different, especially from the perspective of participation, and in music and sound art the focus on what one can *do artistically* with the technology has largely replaced the focus on what the new affordances of technology permit; what it is *possible* to do. This is a huge shift, and suggests that the ambitions of the 1950s and 1960s of real-time performance with technology, as described by Max Mathews, Gustav Ciamaga, Knut Wiggen and Peter Zinovieff (to name a few) have come to fruition with the DIY approach and a more symbiotic relationship between technology and the arts than has ever existed before.

2. KINETIC ART

Kinetics in art has been the object of renewed focus, forming part of the attention to music as a more comprehensive set of actions and experiences than just pure listening and conventional performance. Physical installations that change with user actions or other external input invite participation, and the listeners' engagement connects to their creative impulses as they explore how their actions give results. We see this in the visual arts as well as in works with a more musical

intent, and the strong modernist focus on the material and its inherent qualities has been pushed aside by more postmodern and neo-modern expressions that we for reasons of simplicity can bundle together as relational art. It is in between people, or between people and their preconceptions, ideas and thoughts that art emerges. The academic echo of this movement in the arts has spilled over among younger researchers into the notion of the 'cartesian split', where the mind and body live separate lives, relatively unconnected. The ambition, also there, is to bring tactile, tangible elements back into the equation and not let all variables stem from intellectual processes.

Arts such as dance, theatre and other types of performances have always depended on linking direct physical movement with the psychology of cognition, however, in electroacoustic music the abstract movement of sound has been the core of attention; conventional diffusion and 3D sound practices can produce a sense of movement by only pushing air. However, over the last 20 years, with dropping prices on hardware and a radically new availability of small-scale electronic components that can easily be programmed into functional tools for art, a new interest in live music and participation has emerged. Conferences such as the International Computer Music Conference (ICMC) and the New Interfaces for Musical Expression (NIME) show an abundance of this type of interest, and the growing attention in academia to multi-disciplinary practices arguably brings engineering, research and art together on a scale never seen before. New art forms such as sound- and installation art, plus more or less scientific explorations of physical principles, all follow from the core affordances of digital technology: precision, control of complexity, and data migration.[3] These practices also contain an implicit critical perspective – a recognition of the limitations of the reduced listening, where any type of materiality should be avoided. How otherwise, for example, would the term 'site-specific music' have any meaning?

3. THE APPROACHES TAKEN IN THIS ISSUE

This issue of *Organised Sound* is a first attempt at bringing scholarship together for closer investigations of the disciplines of kinetics and movement in electro-acoustic music and sound art. Rapidly expanding technology changes the shape of music, and without an in-depth understanding of these changes, scholarship of sound-based music and the creative use of music technology might easily become irrelevant for any future engineer/instrument-maker/musician/composer.

The articles provide some pointers as to which directions these future discussions and practices might

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[2]For a developed argument for this perspective, see Trevor Pinch and Weibe Bijker (1987).

[3]For a more elaborate discussion, please refer to Rudi (2019).

take. They identify an apparent undercurrent of practitioners calling for the need to understand and align the material and developmental ecology of 'performance, making and devising', with the well understood and researched discipline of acousmatic music composition and diffused performance. Abstract composition is now permeating into a world that is looking to comprehend what has been described as 'the corporeal turn', which is an area of research that pertains to 'the body and bodily life', showing that 'whatever the specific topic being examined, it is a matter of fathoming and elucidating [animate meaning from] complex and subtle structures' (Sheets-Johnstone 2009: 1).

Some texts in this issue look beyond the body towards the relationship that exists between the material world, sound and cognition. These investigations have arguably been in motion long before Gibson's 'Theory of Affordances' (1977), further elaborated in Norman's *Things That Make Us Smart* (1993) and Clark's *Supersizing the Mind* (2008), to name but three out of countless publications. The authors in this issue give us a glimpse into an understanding of a wider discipline that links music with an artistic ecosystem that is both physical and temporal. Mind to body to material object to artistic ecosystem to (cultural) history: everything is linked, and the academic tendrils of research that weave between each element helps us transcend each one as individual components with the intention of attaining an elusive holistic understanding of a fully formed creative musical endeavour. A healing of the Cartesian split, as it were.

The use of physical objects in combination with electronic means springs from a mixed genealogy of musical automatons, algorithmic composition, acoustics, kinetics and different performance practices. In his article, Asbjørn Blokkum Flø describes and discusses the history of kinetic art and finds that it reaches almost as far back as 300 BC. At that time, kinetic installations were used for displaying principles of water, wind, weight and steam. Flø argues that this type of interest in materiality is a key element for explaining the recent upswing of kinetic art, and that it also opens for artistic dialogues with material that has 'cultural meaning'. Historically, Flø sees that this brings about changes in the immaterial art of music, that with literature has been considered on a higher level than material-based arts such as painting and sculpture. As examples on the dialogical system between material and artistic idea, Flø discusses several of his own works, where digital modelling and engineering is necessary for extracting information on the spectromorphological qualities of the materials before the physical elements are designed and elaborated. As a whole, Flø's text combines historical and musical perspectives, and explains how the scientific exactness needed for detailed timbral control is also necessary for use of materials with cultural significance

beyond the artistic qualities. This approach places his works between musical instruments and sculptures.

In their text, Linnea Semmerling, Peter Peters and Karin Bijsterveld discuss three exhibitions of sound art, and how curatorial practice has combined different cultures for 'making' in the exhibition spaces. As Flø, they discuss the field along long historical lines, and describe how fascination with the 'magical invisible' and the automaton has developed into more contemporary philosophical articulations of boundaries between human/machine, hearing/seeing, mechanical/human, and craft/autonomous art. These articulations have been parts of the elaboration of the curatorial concepts. They discuss how curators 'draw on a wider cultural fascination with automated movement to guide [the visitors'] explorations of the contemporary artworks', combining high and low art, art vs craft, and use the historical fascination to go beyond normal presentation of contemporary music and art. This mixture of high and low art springs from the general notion that sound art provides something more 'to hold on to' than conventional electronic music, and that this can be an effective bridge between high and low art. From the curators' side the historical material was intended to raise the visitors' interest in contemporary sound art, and the exhibitions can be said to aim for changing the visitors' listening habitus itself, to draw on Bourdieu's term. Furthermore, Semmerling; Peters and Bijsterveld discuss how the term 'kinetic art' has been expanded by ideas of system art, process art, cybernetic art and the broader conceptual art, and how this provides the discussion with a new and possibly better suited vocabulary for making explicit exactly 'how things work'.

'How things work' is scrutinised in great detail in Christian Blom's article, where he in very concrete form explores what the term 'transmediality' might mean. He is not discussing the type of complex installations that Flø and Semmerling are using as examples in their texts, rather he describes a detailed step-by-step examination of a compositional process where he has reduced the active elements of sound, light and movement to the absolute physical minimum. His material of investigation is taken from musical machines and compositions that would suffer should one of the elements be removed, and the transmedial perspective activated in his works is one of interdependence between elements – not mirroring. It is *together* that the elements tell the story; they are not different realisations of the same idea. Questions of mirroring and what actually constitutes coherence become central, and leads Blom up to the question of whether a transmedial composition of this type can meaningfully be categorised as music. This type of study of the transactions between objects and humans in artistic processes are frequently explored in the relatively new practice-based programme for artistic research in Norway, from where Blom has his PhD.

Another interesting perspective into the discussion about transmedia is articulated in Jaime Oliver's treatment of the Theremin instrument – its development and history. In his text, he describes how Lev Termen inaugurated a new practice of music circulation by borrowing the timbre, vibrato and repertoire of traditional instruments, and remediating them electronically. The essential features of both instruments and performances became inscribed in electronic schematics, and Oliver discusses the schematics as a new type of musical notation – remediating timbral and performative parameters, while documenting the huge public interest in this new instrument and its promise for the future, evident in the New York press. Electric music was the music of the future, and the Theremin was thought of as pivotal in this development. While his article is mostly written from a media theoretical perspective, Oliver also describes the construction of the Theremin, and how the instrument worked by way of sensing the total capacitance of the musician's body. Notably, this is the reason why the performers stood so remarkably still when performing, interestingly contradicting notions about music and movement that do not take the concrete playing modes of the various musical instruments into consideration in their focus on movement alone. Termen's design was a voltage-controlled synthesiser and due to lack of repair facilities, its schematics were widely and freely disseminated among musicians. This circulation of schematics can be seen as an early precursor to the practices of current maker- and DIY communities. Don Buchla and Robert Moog undoubtedly drew on this distribution in the development of their future synthesiser designs.

Using the body as an active element in performance is perhaps most intimately described in Anna Troisi's article about the use of a vaginal probe for extracting data (pulse and pressure) that can be used to control parameters in sound processing in live performance. She positions her project *OB-scene* as a manifestation of Latour's ideas of fusing the body with technology in order to create a new type of 'actant' that can perform data from emotional and physical sensations. The computer receives data from emotional experiences, and Troisi argues that the body and the technology fuses into a sonorous object.

Using feminine sexual arousal as a material for controlling signal processing obviously links her research project to a sexual politics and a feminist agenda. She briefly discusses xenofeminism and technofeminism with its focus on technological alienation of basic feminine experiences, however, her project is less focused on feminist agendas than the cyborgian fusion of body and technology. This type of manufactured relationship between body and technology has significant historical precedents, from which Troisi brings up, for example, Atau Tanaka's wearable instruments where the body itself becomes the source

of the music. With her remediation of the vaginal probe into a music controller, she activates a curiosity in the audience, and addresses an interesting discussion regarding various taboos about the presentation/definition of sex in performance.

Neal Spowage looks at instrument types used in live electronic music performance in light of extended mind theory where objects, because of their couplings to the cognitive system, are considered to be part of the mind; together they form a distributed system.[4] This inclusion of the cognitive system necessitates a focus on what the instruments look like and how they function. Spowage argues that distinct physicality of instruments provides better opportunities for expressivity in performance than what he describes as 'discreet' instruments, where the links between physical action and sounding result is less clear. Underpinning his argument, he uses the idea that (automatic) kinaesthetic empathy is essential for perceiving and understanding body-motion, and that the physical actions necessary for playing an instrument are valuable for the cognition of a musical work. From a musician's perspective, the action is a physical and organic realisation of his/her cognition whether solo or as part of an ensemble, and the audience will benefit from the reification of his/her creative musical devising. Spowage presents a strong argument for new musical controllers that aim for a fuller integration of the musician, drawing on the shared proprioception that follows from the physicality of our bodies.

Proprioception is also the essence in Luca Forcucci's article. He has investigated how audiences perceive space in electroacoustic music, and found that the mental visual imagery of acoustic space that listeners create while making meaning of what they hear is linked to their perception of body and movement. The listeners imagine their bodies as present in the acoustic situations that they hear in the music, thus their personal physicality and experiences play a role in the experience. He anchors his claim in a hermeneutic description of sound experience out of cultural context, where spatial illusions emerge in the listeners (Artaud 1958). Forcucci positions his research, which was also the core of his PhD, as an extension of the Intention-reception project (Landy and Weale 2003). Participant reports on the acoustic spaces used in the five musical works that were played as part of the experiments were remarkably consistent, and Forcucci's project adds to the body of work that aims to gain deeper understanding of how our bodies precondition us for the experience of music.

The preconceptions of music have also been challenged by Benoit Maubrey in his work with wearable audio. His different ensembles have constructed performances for several decades, drawing on acoustic

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[4]This has been discussed in Clark and Chalmers (1998).

environments and cultural contexts. In his interview, he provides several examples, and it becomes clear that his explorations show similarities to street theatre, and that his interventions can often be read as having political overtones, as for example in Linz, where steel workers' protective gear was used, and in Oslo, where the royal palace guards were mimicked by The Audio Ballerinas. In this manner, Maubrey's use of sound in public, outdoor spaces underpins his intentions of bringing in a perspective outside of normal conventions and disturbing the normal perception of situations and spaces, by 'using loudspeakers as brushes on the outdoor canvas'. He discusses how using wearable audio allows him to draw on local acoustics, creating familiarity while at the same time aiming to disturb the viewers' perspective on daily life, stirring emotions that would otherwise have remained dormant. The interview describes how the artistic ideas of participation and public engagement have remained a constant in the continual technical migrations to more complex equipment with richer affordances for participation of audiences and environments. From simple beginnings with cassette tape players to the current solar-powered samplers and portable speaker systems, all integrated in dancers' costumes, live interaction with sonic environments has become part of the performances, allowing for more immersive experiences in his work with social aspects and the kinetics of choreographed dance.

Perception of situations and spaces is addressed in a more psychoacoustic manner by Joan Riera Robusté who chronicles experiments that investigate how we perceive sound and its movement within a space. He achieves this through placement, grouping and amplitude of simple tones, and observes their effect upon the resonance, absorption and reverberation produced by the physical (acoustic) space and the body, and their effects on the auditory system. These experiments describe processes of investigation that are more closely related to sound art than traditional acousmatic composition as they avoid the use of additional sound processing to achieve their intended result. He identifies numerous techniques that primarily use the movement of sound through space to affect variations in pitch and loudness; the creation of variable and dynamic rhythmic structures, texture qualities, and spatial gestures; and the possibility to achieve different perceptions of spatial depth using simple sine tones and a standard eight-speaker diffusion system. He follows these investigations with a discussion on how he composed works of varying length using these techniques, and comes to detailed conclusions regarding their effectiveness in achieving authentic, complex and interesting sound objects for composition from their simple waveform point of departure.

4. CLOSING REMARKS

It is notable that much of the discussion in this issue revolves around 'process'. Semmerling, Peters and Bijsterveld describe how it is used to invoke the 'magic invisible' contained within the presentation of ancient automata and kinetic sound art, and Blom discusses transmedial composition as a process which uses many interdependent components to create a finished work that would not be able to maintain its final form were just one component to be removed. The same could be said of the developmental process of the Theremin, as it transitioned from being perceived as a replacement, or evolution, of instruments that came before it to becoming an instrument in its own right. If any steps along that particular temporal journey had been missed, the Theremin would not have become the instrument we know today. In a sense, this alone forms an invisible, ontological movement of sorts over time. Also invisible, we cannot see the micro-vaginal movements that generate the data for Troisi's performance, or the movement that is perceived virtually within the bodies of an observer noted by Forcucci in his audience, but they exist, are real to those who experience them, and yield tangible results. Troisi and Forcucci utilise a person's reaction to external stimuli; Troisi as a performer, whereas Forcucci uses it to bestow an experience upon the audience. There is also movement that is visibly perceived and understood by others, better known as kinaesthetic empathy. Spowage describes how it allows us to perceive the externalised thought processes contained within the performance of a musical ensemble or soloist, and how it can be used to attain the best performance from an instrument or interface.

Moving away from the body, Flø and Semmerling *et al.* provide interesting insights into how an audience comprehends the construction of an installation or automaton, whether it be through their perception of sound and materials in the case of Flø, or how an audience identifies with its cultural history in the case of Semmerling, Peters and Bijsterveld. Their insights help us understand what links us to, and separates us from, historic music automata and kinetic sound art. These understandings and interpretations are what the artist gives us, whether intentional or not, for our attention and presence. And thus we become the intrinsic human element of all these various processes of making, performing and interacting. and

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