R Routledge
Taylor & Francis Group

Inside-out Instrument

Yolande Harris

Acknowledging a radical shift in what it is to play an instrument in a technologically expanded environment, this article explores ideas of a turning inside-out of the traditional body-instrument-space. By treating the instrument as a situation of engagement with a technological environment, rather than as an interaction with a specific object, and by including in this concept of instrument the acoustic, visual and natural context within which it is placed and interacts, the inside-out instrument develops, not as an exoskeleton, but as an exocentric (rather than egocentric) space of interaction. With the increasing fragmentation, miniaturization and network communication of digital technologies, the instrument that uses these means is distributed, largely invisible and intangible and un-coupled from its apparent source of sound production: the body. Now the body inhabits and navigates through this instrument, instead of holding it; the sound and tangibility of the sound comes from outside, rather than generated from inside the body; and the audience spectator no longer has the focal point of body-instrument-sound, but explores as one of the players. It is like a turning inside-out of the intimacy of the musician-instrument into a space inhabited by multiple performers and instruments. Part of this inside-out instrument is the treatment of space through light and image projections as well as through sound. The audio-visual-spatial nature of the instrument is a central part of the discussion and the article identifies precursors to this spatialization, including works that create the folding of space with cameras and projectors used as instrumental extensions of the body. The Light-House, the Video-Walks and (to a lesser extent) the Meta-Orchestra[1] will be used as examples of the three forms of inhabited, explorative and collaborative instruments developed as part of the author's performance research project Score Spaces.

Keywords: Inside-out; Sound and Video; Sensors; Ventriloquism; Dispersed; Landscape; Aesthetics

Introduction: Why the Inside-out Instrument?

The inside-out instrument is a concept that has grown out of a practical and personal experience with performance using extended instruments, sound, video and digital technologies. Given the complexities of this environment, where composition

dissolves into an activity more collective and improvisational, where the performer can no longer command full attention over the distributed sounds and images, and where the space itself moulds and influences the decisions and results of sound and image, the audience find themselves in an unexpected state of exploration. In this context, one of the most prominent questions to ask as both audience and performers is where the instrument now lies in relation to the body, and how this previously solid duo has turned itself outwards into a weightless being as distributed and fragmented as the technology used?

From the experience in the projects described here, it has become impossible to avoid the change from the traditional structure of music relying on the poles of composer, improviser, performer, instrument, score, audience. Although different roles (Harris & Bongers, 2002) may be suggested in relation to the Inside-Out Instrument, it may be better to see it as a shifting field of overlapping expertises. An inevitable question is how to replace the traditional musician back into the inside-out instrument! To understand the point of growth from which we turn inside-out, we must start at the solid given of a musician's body in relation to their instrument. There is always a visual aspect of a musician/instrument to the audience/spectator, and it may help to think of this to establish a continuity between the 'traditional' and the inside-out, which incorporates a visual aspect as important as the sonic. By using the term 'traditional', I try to encompass not only the technological object of an acoustic instrument, but the whole set-up of presentation surrounding the reception of music using these instruments.

There are two categories of examples in this article: one is specific pieces from diverse sources chosen both for their originality and illustrative potential, and the other is examples from my own practice that have led up to the notion of turning an instrument inside-out. Believing that a description cannot substitute for a direct experience of any of these pieces, only the details relevant to the discussion here will be mentioned. I will not provide an analysis of any of the examples, but rather try to illustrate through them the potential of the inside-out instrument concept. For further details on any of the pieces mentioned, please refer to the author.

Egocentric

Consider the traditional relationship between a musician and their instrument and the intimacy is immediately clear. The intensity of this relationship is greater than an everyday object or tool primarily because one produces sound through it; it is an instrument for making music. Yet it is this fundamental negotiation between the musician and the instrument that is now turning on its head, the problem lies at the very heart of the construction of music—that of the production of sound through body and instrument. In order to get beyond it, let us first consider the sound-producing body without an instrument. The voice is the bodily production of sound without instrument. Douglas Kahn (1999, p. 7) describes how we hear our own voice in a way fundamentally different to how we hear others' because, in combination

with the sound dissipating through air, one's own voice is 'conducted from the throat and mouth through bone to the inner regions of the ear'.[2] The similarity between voice and particularly wind instruments with their connection to breath and mouth, makes one aware of the inner workings of the body. It is as if when singing, speaking or playing one makes the inside audible to the outside.

Someone comes across an instrument, perhaps for the first time. Knowing it as an instrument to be played, but not knowing how to play it, they have the idea to take it in their hands, to put it to their mouths and blow, under their chin, between their knees, to sit in front of it. In this initial negotiation with a strange instrument we have to work out from our own experience and from the suggestions of shape and scale how to approach it, from which side and in what manner. The more experienced, bold or childlike approach it by striking it, blowing it in many ways, bowing, tickling (?)—anything to test if sound can be made and if so how and of what quality. From here the body-instrument relationship grows. And out of the physical ability to play an instrument, music develops further through listening. The sensitivity and dexterity of touch, whether the embouchure of the lips or the suppleness of the hands, develops as the sound becomes more and more and more. In a musician's relationship with their instrument, the tactility of the interface is not purely manual; it comes through breath control, lungs, throat, tongue, lips, nose, reverberating in cheek bones and teeth, posture, pressure and all the fine gradations of musculature that loop from control of production of sound through to the hearing and the ear. The whole body is in reverberation in a process that reaches into the body on one side and out to another body through sound. These reverberations are felt, not just heard. The instrument is part of this sound-producing body; it is hard to draw a line where the instrument begins and the body ends, or where the instrument ends and the next body begins (Harris, 2005).

There is a seduction in this relationship with sound through instrument. A musician's life consists of a constant relationship with their instrument; it cannot be left, it cannot answer back, it demands sensitive physical contact, and it haunts because of what can be said through it! If you cannot speak these touches, you must touch another. This is not so much erotic as transcendental in that your body becomes resonant with the sound that you create, that you have an impression of controlling, although at times your fingers trip, you are clumsy, there is a glitch, and you are jolted back to a reality you have tried to avoid all this time. This is the core of the matter: through practice and perfection of bodily instrumental skill, playing an instrument potentially allows one to transcend that same body through sound.

The musician-instrument forms a knot, a focal point. This contains the energies of the player, speaking through the instrument, as it were. Indeed here the voice is just another instrument. The audience come to watch knowing the sound produced by this focal knot is particular and will fill the space with a sound they have come specifically to hear, and a personality they have come to see. The sound is related directly to the instrumentalist, both in the training of the musician and in the

expectations of the audience. This sound belongs to him, like his voice, this musician speaks, through the instrument he plays.

Turning Outwards: Ventriloquism

This intense knot of musician is comparable to the vanishing point, ordering the spectators' view-point by a protocol that makes them passive. Yet this protocol of the focal point has gradually shifted, moving so far away that the impossible has happened: its dominance has been broken and the vanishing point (read 'musician-instrument') has become just one in a milieu of techniques. Would it not be a ventriloquist's act to make this egocentric sound come from somewhere else, or someone else? Ventriloquism, defined in Webster's dictionary as 'an utterance which makes hearers think that the sound comes from a source other than the actual speaker', reels with disembodied voices, personalities coming alive by possessing a sound that actually cannot come from them. The viewer is fooled and accepts this dilemma.

Steven Connor (2004, p. 19), in his study on ventriloquism, explains 'the success of ventriloquial illusions depends, not upon the isolation and intensification of the sense of hearing, but rather upon its deficit. Far from depending on the separation of eye and ear, ventriloquism enforces their close co-operation'. One must see that the voice does not always come from the mouth of the singer, that there is a gap. *Three Voices* (1982), Morton Feldman's late composition for singer Joan La Barbara, melds the live voice with her pre-recorded voices emanating from two speakers placed behind her. Feldman (1989) says: 'I saw the piece with Joan in front and these two loudspeakers behind her. There is something tombstoney about the look of loudspeakers. I thought of the piece as an exchange of the live voice with the dead ones'. In the music, the three voices blend identically in timbre so that the only discrepancy between the three lies in the lack of live bodily production. Paradoxically, by each voice remaining almost identical, her voice has become displaced both metaphorically and technically from her body.

Technological developments have made the instrument into a ventriloquist's act! We are all familiar with the disembodied voice of the telephone; its now mobile equivalent leaving even the location of the voice unclear to the listener. The disembodiment of the sound came about primarily through recording technology and is a central issue in the performance of live electronic music. Here the sound no longer comes only from the body of the musician, but rather from a sound system placed throughout the space controlled by a sound-engineer. Simon Emmerson's (1994) distinction between local and field, where '*Local* controls and functions seek to extend (but not to break) the perceived relation of human performer action to sound production. While *field* functions place the results of this activity within a context, a landscape or an environment', lay out the difficulties caused by this in the performance of electronic music with an acoustic instrument. It primarily lies in a discrepancy between the acoustic sound generated bodily and emanating directly from the musician and the electronic, recorded or sampled sounds put into another part of the space and literally disembodied beyond the instrumentalist's sensitive control. This discrepancy, also

experienced by the audience, is uncomfortable because even in the local/field model one still relies on the focal point of musician interfacing with their instrument, thus remaining within what I have described as the egocentric tradition.[3]

Circles/Inhabited

The turning inside-out of the instrument/body through technology into space can be seen clearly in two examples: the dislocation of the sound source from the body where it is produced, and the mirrored folded spaces filmed by cameras directly linked to a body, but perceived from outside. A series of works in the early 1970s by Dan Graham use the camera in a way that leads us up to the inside-out instrument. *Body Press* (1970) and *Helix/Spiral* (1973), both for two performers, use the camera as a mobile viewpoint that geometrically reflects back on itself and the camera of the other. The filmic scenario reads almost like a musical score describing the movements and speed of the two cameras in relation to each other, to their viewpoint and to their bodies. In *Helix/Spiral*, the first camera is held flush to the body and rotated slowly from the top of the head down to the feet, filming the second camera. This second camera, held to the eye, walks around the first in a spiral focused on the inner camera. It reaches the center when the first camera reaches ground level. The two have to coordinate their movements and it is the movement and its relation to the body that makes up the image: '[A]t each moment and point on the body the specific angle of the body's contour determines the camera's plane or angle of orientation' (Brouwer, 2001, p. 143). By treating the camera like an instrument, albeit collecting image rather than giving out sound, the 'choreography' makes visible a refracted and reflected space highlighted in the final presentation by the projection of the two videos on opposite walls.

  Light-House (2004–2005) is a series of pieces by the author that explore the circular motif of a lighthouse loom in its alternative forms of sound, movement and light. They take forms of centripetal and centrifugal motion, spinning around a fixed point, always throwing light and sound out into an expanse. Seen from some angles as a flashing dot becoming visible then disappearing, the loom could be seen from the central point as a continuing turning circle. It is these differences in viewpoint, already seen in *Helix/Spiral*, that form the basis of a diffused yet paradoxically focused situation, explored in sound, projected image and in the use of light sensors. The common thread throughout the series is in the use of light-sensors that form feedback loops between projected image/light and sound.

  The single-screen video performance *Light Phase* (Maastricht, 2004; Thessaloniki, 2005) has two light sensors placed on the screen detecting the change in light levels of the projected moving images. These levels are themselves used as input controllers for a pair of phased looming sine-waves with the change in light mapped simply to the frequency of each. The less light, the higher the frequency, as if the sound grows out of the darkness and is suppressed in the daylight (Figure 1).

The interactive sound installation *Collecting Circles* (Brussels, 2005) removes the image totally, leaving the sound circles themselves to create images in the minds of the visitors. The light sensors here detect change in environmental light, and also are used in combination with lasers spanning the space. Aimed at the light sensors, the lasers steady the readings until the laser beam is broken by walking through the space. These threshold levels are then related to other looming sounds and their circular panning. The speakers are hung on a central column so that the panned movement of the sound exactly mimics the lighthouse with the result that one hears the reflections of the sounds as they bounce off the walls of the gallery space (Figure 2).

HoWhere_r_u? (2004) is scored for turning wind quintet, five head-mounted lights, two light sensors and two phased sine-waves. In this piece, each player turns around their own axis, their head-mounted light influencing the light-sensors in the space, and so influencing the sine-waves and ultimately changing their own sound in relation to these changes. The feedback loop of the instrumentalist through movement, light, sensors and back through sound forms the basis of their behavior during the composition.

In *Spin* (2005), as in *HoWhere_r_u?*, the human performer is added as the source of the circular sound and light. Spinning around the fixed axis of the body creates an unstable system which, unlike the mechanized lighthouse, cannot go on indefinitely. The performers must develop strategies to deal with their dizziness, starting, stopping, changing speed and direction. In *Spin* for turning trombonist[4] and turning Video-Walker, these decisions have a direct musical and visual implication by making the performers part of a compositional loop. The trombonist, steadily turning around his own axis, breathes a continuous stream of textured sound. The trombone is a very
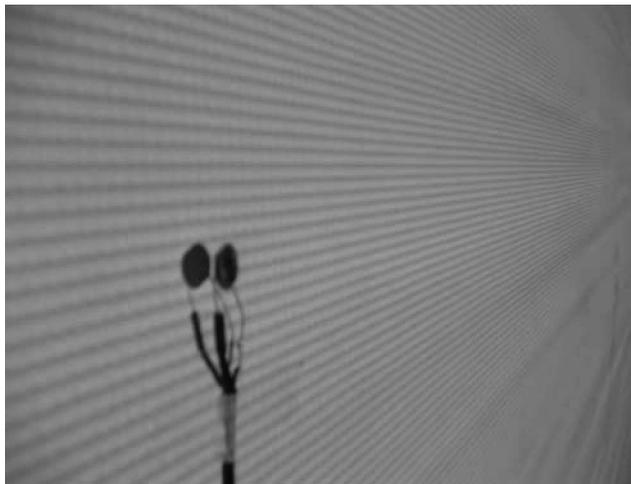

Figure 1 Light sensor in projection screen, *Light Phase* (VideoDance Festival, Thessaloniki, 2005).

Figure 2 *Collecting Circles* interactive sound installation (CCNOA Gallery, Brussels, 2005).

directional instrument so by turning in an acoustically reflective space, one literally hears the shape of the room. The musical parameters are partly dictated by the space, to find the best volume and reverberant pitch areas, partly by the sound of the phased sine-waves and partly by the stamina of the musician. The second performer, the Video-Walker, carries a video projector and source material and plays it as an instrument, turning steadily around the body's axis, projecting a stream of light. Instead of using a reflective surface or screen in order to make the image visible, here it reflects off and explores the space it finds. More like a searchlight, the Video-Walker highlights the trombonist, the audience and the space.

In both these pieces the normal interaction loop between two performers is extended by a technological interference. The performance space, fitted with the light sensors that are influenced when the light beam of the projector passes, monitors the change of light converting the information into the sound of phased sine-waves that create their own sonic loom. These dynamic sine-waves therefore reflect both the speed of turning and the density of light in the projected image. Hearing this, the trombonist modifies his playing to the sound of the sine-waves, and, as the trombone sound changes, so the Video-Walker modifies the images, which in turn modify the light levels, performing a loop that continually evolves.

Explorative/Landscape

Gordon Mumma's *Telepos/Foxbat* (1971), created for the Merce Cunningham dance *TV Rerun* (1972),[5] makes a not dissimilar contribution to the uncoupling of sound-source from the body. Using available analog electronics Mumma designed belts for the dancers each equipped with three sensitive accelerometers that transmit

frequencies wirelessly to a receiver in the space then routed to the speakers. The parameters of acceleration and deceleration as well as movements of breathing mean that the body of the dancer controls the sound.[6] Whether these belts actually become instruments, the dancers musicians and the builder of the belts composer may be questionable in the traditional sense, but it is illustrative of the melting, blurring roles instigated by electronic technologies. The version of the same piece, set in an eroded landscape, that appears in Robert Ashley's video portrait *Music with Roots in the Aether 4* (Ashley, 1976), may be more visionary. As the dancer climbs over the terrain, each movement reflects the topology of the landscape, forming the basis of the sounds produced.

Imagining a moving projected image uncoupled from its screen, we started to pick up, then carry and then walk with our video projector. Using it like a torch, we walked through a Catalan forest (2002), the length of a wild Spanish beach (2002), a duet in a derelict Dutch gallery (2003), an explorer in a disused Belgian coal-mine (2005), searching for a resonance between the virtual image of light and the physical territory we revealed. To watch these performances gives a sensation of losing balance, the space tips and tilts, disorientates as you try to find views between the layered physical location and the dislocation of images (Figure 3).

The Video-Walker[7] instrument includes an interface made of sensors to call up and play with live images and sound (also carried). The whole set-up is battery powered, thus un-tethered and portable. The version *Project Relay* (2004 – 2005) includes a second instrument based on a video camera relaying its image wirelessly to another location within physical line-of-sight. The two instruments, the Projector and the

Figure 3 *Project Relay/Video Walker* exhibited in 'Welcome to Fused Space Database', a group exhibition after a competition of ideas for new technologies in the public domain (Stroom Gallery, Den Haag, 2005).

Relayer, make feedback loops of real, projected and filmed spaces, dislocating the image from the screen and, in doing so, open up a much larger possibility for resonance between the image and the space in which its placed.

The Video-Walker and *Project Relay* place the body/instrument to explore in a wilderness. The space/body is one of exploration and meandering, finding one's way, rather than linked to a fixed point or center. Indeed the focal point is not really on the player, but on the path he or she reveals, and the image taken in by the camera (Relayer) is relayed to another space where it can simultaneously be viewed. The spaces are folded, the viewpoint fragmented, emphasizing the distribution of image in space and confronting the visitor with the idea that there is no privileged space from which to view (Figure 4).

Exocentric/Collaborative

In both *Telepos/Foxbat* and *Project Relay* we have moved outside to exterior spaces. To continue this movement from inside to outside, from center to a center that disperses in an environment, aware of its context, the body starts to inhabit the instrument rather than hold it. In an exocentric idea of the body/instrument relationship, the instrument is diffused, away from the body but surrounding it and in constant interaction with it. This is conceptually a very different position from the exoskeleton, where the technology meets the body at the skin, sometimes even below the skin, but keeping the body in the focal point. The distributed character of developing technologies, primarily due to their miniaturization, wireless portability and the network infrastructures that have allowed the computer itself to be de-centralized, is directly reflected in the exocentric work. There is an invisibility to the

Figure 4 *Meta-Orchestra Mine* (Genk, 2005).

technology, the interface is also dispersed and minimal. Players and audience now navigate in sonic, physical and electronic environments that can be invisible, intangible and dispersed. Multiple bodies can inhabit and play in this space, this 'inside-out instrument'.

If music is the inhabiting of time through sound, the inside-out instrument introduces the parameter of being within space. In order to consider space as an instrumental parameter, it is important to question what defines the space: its edges, its density, its lines of activity, or other people within it? Is the 'empty' space still full, but inactive? Sound and light fill a space, but they are also intangible, reverberant and dispersive. Is it an interior or exterior space? Does this inside-out instrument belong equally to the landscape now? The space of music, the concert-hall or acoustic space, is turned outward like a sock, wearing its inside on the outside, the limits extended, no longer a reverberant chamber.

The simplistic interface of the computer does not allow for a physical virtuosity, the complexity coming from the computer itself, putting the performing body in an inferior position to that of the traditional instrument. The computer allows us to set off processes, to collaborate with it in both composition and performance, and unlike the acoustic instrument, the computer can continue making sound when left alone. In this, the computer apparently demands a position of autonomy, fooling us into thinking that we have less control over the production of sound in real time than with a traditional instrument. It is instead a different kind of control directly related to the types of technologies used. Computer technologies (and I am not speaking only of the laptop here) are modular; have different tasks of sensing, processing and outputting; are expandable when linked in rhizomatic networks; and, as such, provide the musician with a field of inputs, transformations and outputs dispersed in space and time. The sonic and visual focal point has fully dissolved.

Conclusion: Experiencing the Inside-out Instrument

We have moved away from the body/instrument into a technological space that places us as players within it, both audience and performer. The body/instrument is one in a field, an environment within which the audience has equal weight and personality. Walking through reverberating sonic patterns, you explore their effect on your body and your decisions to move. Do you think about the sounds you make and the interaction with them or do they just seem to happen to you? Moving immediately, randomly, how are your thoughts and motions deflected from a course, deflected by the sounds and your understanding that their change is influenced by you? Is this cause and effect, or more a behavior that you encounter? Entering an apparently empty space that is actually structured, spanned by invisible lines (laser, ultrasound), makes a space that becomes structured in one's mind, that one learns to play in and with. Yet where does it happen—your feedback that shows the space is active with character? It is away from you, it does not happen on your skin, but you do share its locality watching the light and image change, hearing the sounds multiply

and disappear. The projections of light cross the room too, to be caught in mid-air or end on white walls. The sounds come from speakers placed fixed in the space, but the sound itself intermingles, mixes and by moving you hear its shape and its curdling structure.

With the increasing fragmentation, miniaturization and network communication of digital technologies, the instrument that uses these means is distributed, largely invisible and intangible and un-coupled from its apparent source of sound production: the body. Now the body inhabits and navigates through this instrument instead of holding it, the sound and tangibility of the sound comes from outside rather than generated from inside the body, and the audience spectator no longer has the focal point of body-instrument-sound, but explores as one of the players. It is like a turning inside-out of the intimacy of the musician-instrument into a space inhabited by multiple performers and instruments.

Notes

[1]   The Meta-Orchestra is a flexible group of performers using electronically extended musical and visual instruments, exploring the relevance of new technologies in extending our perception of unusual places. As a platform for practical research and performance, the Meta-Orchestra brings together the different working strategies of artists and technologists in a non-hierarchical, non-academic structure. The collaborative strategies of the *Meta-Orchestra in Maastricht* (2004) have been written about extensively (Harris, 2004). The *Meta-Orchestra Mine* (2005) is an example of a collaborative space of interaction from which comes the idea of the 'Building as Instrument' (Harris, 2005) and, subsequently, the Inside-Out Instrument described here.
[2]   See also Kahn's discussion of the bodily locations of the voice—in particular, William Burrough's idea of 'schlupping' in the last chapter (Kahn, 1999).
[3]   For an in-depth study that takes Emmerson's local/field framework into the practice of flautists with particular reference to Kaija Saariaho's music, see Riikonen (2004).
[4]   Written for trombonist Hilary Jeffery (www.hiljef.com); to be performed at the Ice-Cellars/Okno Brussels.
[5]   For in-depth discussion of Cunningham's collaborations with musicians using electronic technologies, and his interest in combined and dislocated image viewpoints in his work with video, see Copeland (2004).
[6]   Thanks to Guy de Bievre for finding a technical description written by Maggie Payne.
[7]   *Project Relay* and The Video Walks are a collaboration between Yolande Harris and Bert Bongers (www.bertbongers.com).

References

Ashley, R. (1976). *Music with roots in the aether 4: Gordon Mumma*. New York: Lovely Music.
Brouwer, M. (Ed.) (2001). *Dan Graham: Works, 1965–2000*. Dusseldorf: Richter Verlag.
Connor, S. (2000). *Dumbstruck: A cultural history of ventriloquism*. Oxford: Oxford University Press.
Copeland, R. (2004). *Merce Cunningham: The modernizing of modern dance*. New York: Routledge.
Emmerson, S. (1994). 'Local/field': Towards a Typology of Live Electroacoustic Music. Paper presented at the International Computer Music Conference: The Human Touch, Aarhus.
Feldman, M. (1989). *Three voices, for Joan La Barbara*. San Francisco, CA: New Albion Records.

Harris, Y. (2004). The Meta-Orchestra: Research by practice in group multi-disciplinary electronic arts. *Organised Sound, 9,* 283 – 294.

Harris, Y. (2005). The building as instrument. In R. Bandt, D. Mackinnon & M. Duffy (Eds), *Hearing places: An anthology of sound and place.* Melbourne: University of Melbourne Press.

Harris, Y. & Bongers, A. J. (2002). Approaches to creating interactivated spaces: From intimate to inhabited interfaces. *Organised Sound, 7,* 239 – 246.

Kahn, D. (1999). *Noise, water, meat: A history of sound in the arts.* Cambridge, MA: MIT Press.

Riikonen, T. (2004). Shared sounds in detached movements: Flautist identities inside the 'local/field' spaces. *Organised Sound, 9,* 233 – 242.