

Bodies of Color / Media Skins

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Human Behavior in Interactive Environments

The theme of the Festival – “Intimacy: Across Visceral and Digital Performance” – arouses curiosity. One wants to know what kind of intimacy is involved, and how it moves “across.” Implied in the movement there is also an assumption about the difference between the visceral and the digital, and this assumption concerns us here. In the following, I want to reflect briefly on the practical workshop I was invited to conduct during the Festival (with my design collaborator Michèle Danjoux), then add some critical comments on two dance productions developed by our ensemble – *Suna no Onna*, featured at the Festival, and *UKIYO*, premiered in June 2009. These comments do sway along the curved path, between the physical and the digital, that many of us are describing as we learn to perform in computational ecologies and train dancers, actors and musicians to act out certain behaviors in such environments of change, drawing attention to interface operations and bio-information. I propose to define intimacy, in this context, as a heightened compounding sensorial opening into which we surge. Some call this experience immersive. We call it sensortized.

Dancers rely on a very specialized physical training regime, a deep knowledge and intimacy of their bodies, their bodies’ structures and relations to/in movement, space, and change in time, movement through change. Specific techniques, if you think of William Forsythe’s choreographic vocabulary, require the execution of complex isolations and isometric patterns, inversions and fragmentations at lightning speed. The Suzuki method emphasizes physical (“animal”) energies and a focussed relationship of the feet to the ground, the attraction for the earth which the lower half of the body feels. Other techniques, for example in contact improvisation, spark intensified perception of the movement continuum, in touch with others, sharing distributed weight, strength, lightness, a measured giving and taking, initiating and reacting, a kind of listening to others, and a sounding/breathing with combined

energies, between ground and air, spacetime of uncertainty and expectation. Interfaces imply the “between” – the sense of connection and convergence, a facing of one another, a touch or conversation that also implies proximity, a closeness as in an embrace when I allow the body to touch another body, sensing the other through the clothes. A continuity is experienced in such moments, perhaps it is a kind of intimacy that we don’t immediately know. Yet we generally don’t think of being intimate with machines, or being physically close to someone at a remote distance, even as our senses obviously extend into space and connect us to what we cannot see.

José Gil has described the space of the body as “the skin extending itself into space; it is the skin becoming space” (Gil 2006). The physical, we can infer, is not the digital; the computational space-time differs from yet also repeats coordinates of human corporeal experience, and thus a growing number of theorists now speak of digital embodiment and the “folding of digital code into the biological” (Munster 2006, p. 56). Indeed, the fold is a critical issue, a crease in perception sensibility, and in (fashion) design it is a common concern, not a baroque metaphor. Clothes are folded and unfolded all the time, pleating creates shapes, surfaces rub against each other, our skin is a sensor. Textures and colors of clothes transmit signals, communicating our choice of how we feel or want to express intention and attention, exuding our vitality, emotions, preferences and idiosyncracies, our affective states and how they change, from one day to the next, from one season to another, constant in their ephemeral idealism, functional and excessive (against the logic of function). Sometimes we wear clothes that are not comfortable, but we wear them because they excite us.

Before I continue to speak about clothes, sensors and wearables, can we ask how we carry ourselves in this ecology now presumed to be “second nature” – a world of pervasive and ubiquitous computing in everyday life, and a world of innumerable artificial performance scenarios constructed for audiences (now also called users) to engage in? Have not games and gaming worlds become huge attractions? Do virtual worlds require a new cartography of the body? It is presumed that we have seen the rise of a new interactive art that replaces the theatre – and its fundamental grounding in the performance of the body – with arenas in which the “languages of new media” (Manovich 2001) and the political and material formations of digital culture are

played out. While the theatre of old was believed to be based on an ideal symbiosis between the state (the polis) and the stage (the theatron), today's creative industries or social networks operate in a globalized network-world of interconnections which are of course largely reflective of a incongruously heterogeneous, dispersed, multicultural, multilingual, and socially polarized universe. In such a universe, the question of intimate interfaciality is perhaps quite pressing, it goes to the roots of our sociability and, even more so, provokes ethical questions about our right to (inter)personal privacy in post-panoptic societies where almost everything is under surveillance and trackable. With YouTube, no more Here Be Dragons. Erik Kluitenberg therefore speaks of "delusive spaces" and imaginary/fantasmatic media, when he addresses the "disillusion of the subjective" (Kluitenberg 2008: p. 12). I begin by looking at the imaginary, asking whether we have learnt new interface conventions that enable artistic visions to comment upon the perceptions of the smooth translation between the physical and the digital.

Are you dressed as a range of scalar values submerging the screen, there's something dear julu that must be beyond or in the midst of the other side of the tree, surely the use of values better written point to newer sources?
Is a range of scalar values submerging the screen, there's something dear julu that must be beyond or in the midst of the other side of the tree, surely the use of values better written point to newer sources dressed as you? Are you in your thing, are you in your flesh, ah don't answer... Is Julu wearing your ..., are you wearing your thing?

(Alan Sondheim, *Phenomenology of the Virtual*)

And perhaps it is not smooth, indeed. Avatars often dress badly, but they can fly. My first example (and it was the topos for the workshop taught by Michèle Danjoux and myself) refers to the idea of dressing up with new "wearables." Fashion, in this context, is an important marker of transitional times of "self-fashioning" and image making (cf. the exhibition SHOWstudio: Fashion Revolution at Somerset House, London, autumn 2009) as it continuously reorients our senses to clothing as an expressive medium and our social nature as human beings. Our clothes facilitate social interaction and are a form of self-organization – managing our personal appearance in different contexts and situations and provoking responses from those who interface with us. They are also an expressive medium communicating pleasure

and signalling how we feel about ourselves, how we excite ourselves and want to fly into someone's face.

In our workshop “Bodies of Color” we began with a brief trackback to the compositions of Brazilian artist Hélio Oiticica whose early work developed from abstraction and 2D painting-collages to increasingly 3D works and sculptures, then boxes (Bólides) composed with found materials, installations, architectural models and social environmental projects. His work of the 60s and 70s culminated in the *Penetráveis* and *Parangolés* series. In the late 70s, just prior to his premature death while in exile in New York, he created several installations called “Quasi-Cinema” (audio-visual installations for audience-participants, based on his utopian and metaphysical principles of *vivencia* and the supra-sensorial). The *Parangolés* are provocative propositions for use, sensory experience, performance: they are “wearables” (inhabitable fabrics, colors-in-action) to be felt and experienced, not just seen, and they disperse layered fabric structures into luminescent colors refracting light. “Performing” them, i.e. wearing them, folding and turning them inside out, thus creates changes of the form, the interaction of interior and exterior surfaces, color and light, through tactility as a vehicle of perception. I consider them as significant forerunners of our contemporary experiments with wearables (Birringer 2007).



Fig. 1 Hélio Oiticica, *Penetrável Magic Square No.5*, 1977. Photo courtesy of Projeto H.Oiticica



Fig. 2 Hélio Oiticica with P 04 *Parangolé* capa 01, Still from *HO*, a film by Ivan Cardoso. Photo courtesy of Ivan Cardoso

“Bodies of Color” invited the participants to explore the contemporary (technologically augmented and supported) wearable sensorial interface for performance, by playing with fabrics, cameras, and light projections, wearing cloth and discovering garments as sensors, touching upon the erotics of materials and feedbacks, interacting in a tactile sensorial manner within the real-time mixed reality environment of images, sounds, colors, and tonal stages that increase and decrease according to the performer’s location within the environmental space. Interestingly, there was some resistance amongst our group to work with textiles; sensual technology (viscerally tried on) came as a surprise to some who may have signed up to delve into programming or behind-the-camera work. Gradually, as the space filled with color, this resistance broke down, and the focus shifted to the skin, full-body movement, the touch of light.

Excitation: Real-time Interaction

The performance of *Suna no Onna* is practical research into body-environment interaction and the possibility of using the dancers’ bodies as interface for “wearable space,” regarding the screen surfaces as excitable textures. The textures are the projected sand dunes which form the habitat for the main character and the story we adapted from Hiroshi Teshigahara’s 1964 cinematic interpretation of Kobo Abe’s novel *Woman in the Dunes*. Teshigahara’s film was shot in black and white; we worked to a considerable extent with colored textures, both regarding the worn fabrics as well as the projected digital images and 3D animations. The animation of the still creates the nexus between subjectivity and the extension of bounded self beyond the skin: skin and screen can form a connective tissue. The slow, repeated rhythms of the performance (in the first part) evoke an almost existential state or metabolism, the percolating “sand” a product of the visceral imagination. This “sandness” houses the dancers who wear the soft intelligent garments, their movement make the “sand dunes” appear to move.



Fig. 3 Interfacial design development: SensorDress prototype for Katsura Isobe's role of woman in the dunes (*Suna no Onna*), with mapping of technologies (photocell sensors) and projection onto fish skin. Photo © 2007 Michèle Danjoux

The movement rhythms thus give affective tonality to the overall plasticity of the multisensorial perceptual experience. The movement of sand and dance is audible. It can be felt. Porousness and motion were key ideas we found in the original novel, when Abe writes that

Certainly sand was not suitable for life. Yet, was a stationary condition absolutely indispensable for existence? Didn't unpleasant competition arise precisely because one tried to cling to a fixed position? If one were give up a fixed position and abandon oneself to the movement of the sands, competition would soon stop. Actually, in the deserts flowers bloomed and insects and other animals lived their lives. These creatures were able to escape competition through their great ability to adjust... While he mused on the effect of the flowing sands, he was seized from time to time by hallucinations in which he himself began to move with the flow (Abe 2006, p.15).

Our wordless dance drama merges virtual (hallucinatory) and real images of a life of existential entrapment in an apparently unstable habitat in which insects live as well. The ominous dunes are extensions of the sense and self-identifications of the body,

shaping the unconscious ground where the Woman (Katsura Isobe) meets a scientist-foreigner (Olu Taiwo) who stumbles into her life to become her captive. An entomologist searching for strange insects, he undergoes a Kafkaesque metamorphosis. His captivity turns into a process of adaptation to the environment and a modification of the idea of escape. A third composite character (BlueSpirit, FolkWoman, Insect, EvilVillage) is created by Helenna Ren who at times interacts with virtual screen phantasms whose digital movement animation is created from motion-captured data and resonates with Japanese *anime*. The immersive projections (on suspended paper rolls forming a three-dimensional curved space) envelop the mid- and downstage regions where the dancers portray their characters in an eclectic mix of Japanese, Chinese and African performance vocabularies.



Fig. 4 Katsura Isobe dancing with Leather Sensor Sleeve and Glove, in Scene 6 of *Suna no Onna*.
Photo © 2007 Michèle Danjoux

A main element of the work is the development of performer-techniques with sensorized garments, and thus the collaborative testing of dynamic behaviors and cross-patching between the body and its constructed environment. Following the example of Oiticica's experimentation with light and color perception, we proposed body movements to be extended into designed objects and motion design – what we consider our *sensual technologies* (haptic instruments), the unfinished cloth first adapting the sensors to examine their functionality and transmission qualities. The designer then embedded the Bluetooth wireless devices into the dresses, creating the six composite garments of the “Teshigahara” collection to be performed, adopted to

the characters of the dance and the interactive relationships with digital objects or partners. The wearer works both with internal and external processes, finding her self-expression (through the way the cloth is manipulated or adapted) reflected in the surrounding environment or using feedback from the networked environment to integrate perceptual and cognitive experience. The animated objects are like real-time algorithmic organisms connected to audio compositions which are modulated according to fluctuations in the energy field of the sensorial experience of moving bodies of color. The textures and tactilities of the cloth worn and moved are a central part of this process of digital performance embodiment.

Henri Bergson, who has inspired the current wave of theories on embodied cognition, describes the relation of perception in all of its modes as a mutual entwinement between action and perception:

My perception, in its pure state, isolated from memory, does not go on from my body to other bodies; it is, to begin with, in the aggregate of bodies, then gradually limits itself and adopts my body as a centre. And it is led to do so precisely by experience of the double faculty, which this body possesses, of performing actions and feeling affections; in a word, by experience of the sensorimotor power of a certain image, privileged among other images. For, on the one hand, this image always occupies the centre of representation, so that the other images range themselves round it in the very order in which they might be subject to its action; on the other hand, I know it from within, by sensations which I term affective, instead of knowing only, as in the case of the other images, its outer skin. (Bergson 1896/1988, p.61)

Movement philosophers are now beginning to address the phenomenology of intercorporeality and the bridges between the visceral and the virtual, taking up Bergson, Merleau-Ponty and Deleuze (cf. Kozel 2008; Manning 2009). But missing in interactional design discussions is the point of view of the performer, so rarely articulated in the available literature on interactive dance created by a growing number of artists (e.g. Troika Ranch, Pablo Ventura Dance Company, Company in Space, Dumb Show, Wayne McGregor, Emio Greco, Sarah Rubidge, Anna Ventura, Isabelle Choinière, Christian Ziegler, Nik Haffner, Susan Kozel, Gretchen Schiller, *kondition pluriel*, Carol Brown, Ariella Vidach, Chunky Move Co., and others). Choreographer Dawn Stoppiello emphasizes the slow learning process she underwent, adapting to wearing flexible plastic sensors attached to the joints of her body and a smaller

transmitter box that allowed less restricted, more fluid movements: “On a technical level, we wanted my gestures to control the musical score, the playback of images from a laser disc, the movement of a robotic video projector, and the theatrical lighting for the piece. We realized that this was ambitious, but we wanted to see how far we could go. We wanted to find out how much media one performer could play . . . During the process of creating and rehearsing *In Plane*, I became acutely aware how information would flow back in the other direction. I would see the video move in response to my gestural control, and my dancing would be influenced by my playing . . . Each day felt a bit like my first dance class, overwhelming because I was not yet familiar enough with the instrument to keep track of all of its parts. But perhaps the most important experience for us both came late in the creation process, when the elements had begun to coalesce.” She argues that eventually she began to feel as if the video images were not an external object (to which she was linked by some interface) but seemed like “a hand or a torso or some other part of my body. The medium wasn’t separate from me any longer.” Stoppiello speaks of “entwinement” with the projected images; they become like phantom limbs (Stoppiello 2003).

Julie Bokowiec, in her work with extended vocal techniques and sensors, speaks of *kinaesonics*, a term derived from combining the words kinaesthetic (meaning the movement principles of the body) and sonic. For real-time interactive design, the term kinaesonic means the one-to-one mapping of sonic effects to bodily movements. Within a single composition, Bokowiec writes, qualities of kinaesonic expression can change from moment to moment together with the physical location of processing parameters such as pitch, which in her piece *The Suicided Voice* is located at the side of the left elbow, or on the left wrist. Within the architecture of a single work the “color” and ecology of the system can change, requiring the performer to adopt an equally flexible approach to working within the system. The ability to multitask across a range of both utilitarian and expressive functions forms a significant part of that flexibility. Shifting expressive qualities and the fluidity of system protocols has an impact on the performer’s focus and perceptions from moment-to-moment in performance. An ability to work sensitively and sensually, moving through a range of perceptual and performative states, is also a required flexibility (Wilson-Bokowiec/Bokowiec 2009).

Rehearsing *Suna no Onna*, we soon recognized how important it is to develop the system design in parallel with the performer skills in order to reach a good level of technical capability. Methodologically, our approach to the production of movement in/of the space concentrated on the continuous fine-tuning of “wearable” interfaces, integrating an array of sensors into the garments and accessories that allow a combination of (gesture/motion controlled and photoactive) sensing and actuation in the mixed-reality world to affect an unusual mixture of representational video and abstract digital animation. The intelligent garment prototypes (sleeves, fish skin and coat, laser cut blue leather gilet, silk dress, gloves, belt, headscarf, etc) were developed through an iterative process involving exchange between dancers and designer, and rehearsals with choreographer/filmmaker, sensor programmer, 3D animator, composer, scenographer and lighting artist (cf. Birringer/Danjoux 2009).

Over time it becomes apparent that there is an entire codex of (architectural) elements referring to the functional and expressive directional commands of gesture (tilting, rotating right or left, jolting upward, motioning downward, accelerating along the x-axis, decelerating along the y-axis, etc). This motional grammar reminds us of the importance of the role of movement in the generation of space as such (motor space, visual space), and current neurophysiological research on the complementarity of sensory information adds a dimension that is very valuable for future investigation into sensoriality. When we apply sensor technologies to the skin or the clothes, we might augment or interfere with the visual, kinaesthetic (vestibular and proprioceptive) and tactile modalities through which the nervous system senses the external world and enables bodily orientation and cognitive processing. The dancers are not asked to work with sensory substitution, for example replacing visual with tactile information (cf. Lestienne 2008), but to assimilate complex motor activity into a quasi-virtual 3-D environment – the projected image or sound spaces (media skins) which their movement stimulates. It is in this sense that we think of the projected surfaces as skins reflecting light, as stimulated phantom skins of the dancer who stretches physical body structure to include the rhythms of color and light. The sensation of feeling sound in an area of the body, or sensing the animated digital sand outside from torsions of the arm

or spine (the interior structure) where acute kinaesthetic expression happens, generates a synaesthetic perception that provides a sensate register for control.

Membrane and Phantom Skin

In one scene (“Life in the Sand”), we see Isobe working with the coat’s sculptural forms and abstract shapes, the “sand woman” on the boundaries between the self and the environment, exploring her garment as the thin membrane. Experimenting with all the characteristics of camouflage in the SandCoat, the woman becomes the camoufleur working the sand under her feet, drawing on her animal energy, as Suzuki would say. With her protective layer of coloration, she can conceal, distort, deceive and even advertise (for the purposes of attracting the man) through the use of disruptive pattern (use of light/dark/variable tone) and “dazzle” techniques (bold contrasts), thus merging the moving object-body with the constantly shifting background of projected sand dunes. The digital motion conveys the subtle cadences of layers of sand, a blurring effect that occurs when “skins” of image are superimposed on one another, seemingly elastic and uncanny. Here the form and color of the coat are selected to serve the purpose of concealment and disguise, the design constructing an artificial covering and makeshift shroud of sand grains, colors, tones and textures. Wearing this coat, the woman literally adapts to the environment



Fig. 5 Katsura Isobe with morphic SandCoat, moving the digital “sand.” Photo © 2008 Ilze Black

and her ability to employ the tools of the natural world to ensure her survival. On the digital level, the layered frames reveal a plasticity of the infinitely malleable arrangements of code.

Since the movement of the coat here also moves the projected (digital) sand, the expressive physical action overlaps with the digital. Extensive action calls forth subtle, intensive vibrations on the surfaces of the screen, while at the same time the light on occasion permeates the dancer in its passage through the semi-transparent body. The luminous principle of the projected light/color, in cinematic terms, thus also produces the impact of the space, and the depth of the narrative field itself. Dancer and projection would then have to be called a mixed medium: the light acts as movement image affected by the slow, intimate gestures of the woman in the dunes. We could call it a relational movement that synthesizes the visceral and the digital. Isobe's dance, therefore, creates the dunes environment, and continuously shifts between actual and virtual dimensions, as her velocities of motion and gesture animate the digital data objects, slow them, still them, caress them.

The caressing of skin as a kind of media skin is made most explicit in Scene 5 ("Eros") of *Suna no Onna*, which features the mutual seduction of Isobe and Taiwo in a duet depending on the interruption of transmitted light. Isobe's fish skin houses four light sensors sensitive to light or temperature. Modulating the intensity of light-energy and wavelength, Taiwo opens and closes a small light source that he directs onto the fish skin (worn by Isobe) to take the viewer in and out of a series of black and white micro-filmclips projected on screen. The sequence of microfilms shows the man and the woman making love, naked, hot, sweaty and covered in sand grains, in the humid environment of the dunes. This intimate remotely activated love scene, with the tenderness and vulnerability of the unclothed bodies, intensifies our presumptions about the still clothed bodies onstage and their physical interfaciality (the scene on stage is darkly lit and obscure), as Taiwo's careful gestures seem both tangible and intangible. They heighten the suspenseful oscillation that always occurs between live performance/projected image, the real and the imaginary chasing after each other, as Deleuze suggested in his film philosophy on tactile visibility and

affection-images (Deleuze 1986). Even more crucial for our experimentation with the curvatures of movement was the frame-by-frame motion that the photosensors



Fig. 6 Katsura Isobe and Olu Taiwo (invisible) in the “Eros” scene with projected stills. Photo © 2008 Ilze Black

allowed; we slowed down the data transmission to such an extent that, not unlike Étienne-Jules Marey’s extraordinary experiments with early chronophotography, the physical action generated an unpredictable micro-fluttering of individual frames, a shuttering of intimacy.

What I am arguing for is not an intimacy between human actor and machining architecture; rather, I am describing scenes that have emotional and narrative layers which are created/experienced subjectively through the movement sensations that flow – in the feedback environment – between the actors and the audio-visual world. Movement and (light) modulation here compose the erotic, they are erotic and at the same time operate as transmutations of digital objects and spatialized images, thus rendering the movement with the images and the movement within the images simultaneously real and virtual. What was drastically new for our performers was our proposition to compose the spatialization, so to speak, in real-time, to “wear” the space like a garment and to treat the clothes as a skin that is highly sensitive to the most subtle variations of touch.

Second Life Intimacy

Here however garishness is the premise and the promise of the virtual; there's no reason for camouflage in an airless space.
(Alan Sondheim, *Phenomenology of the Virtual*)

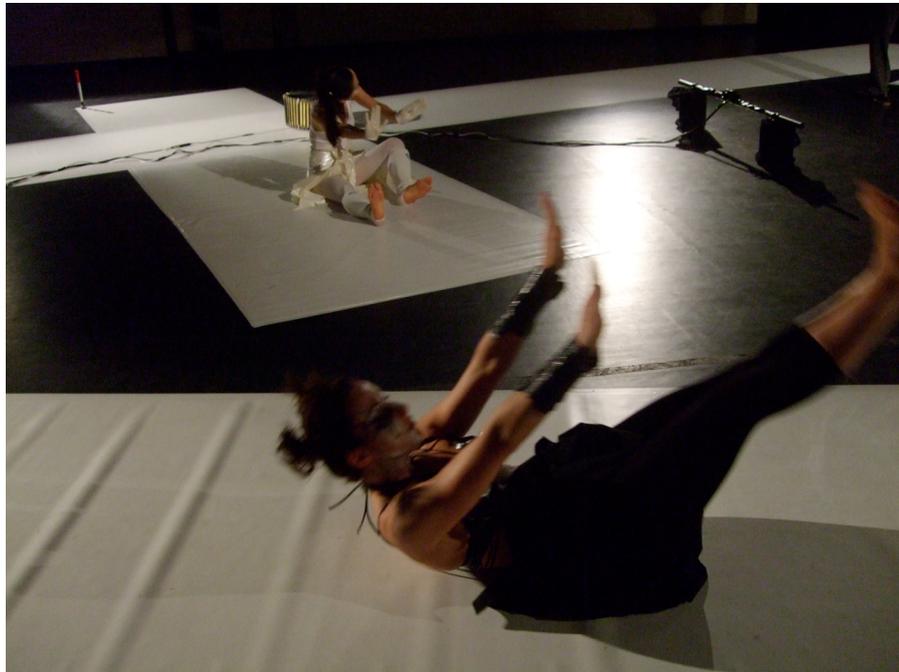
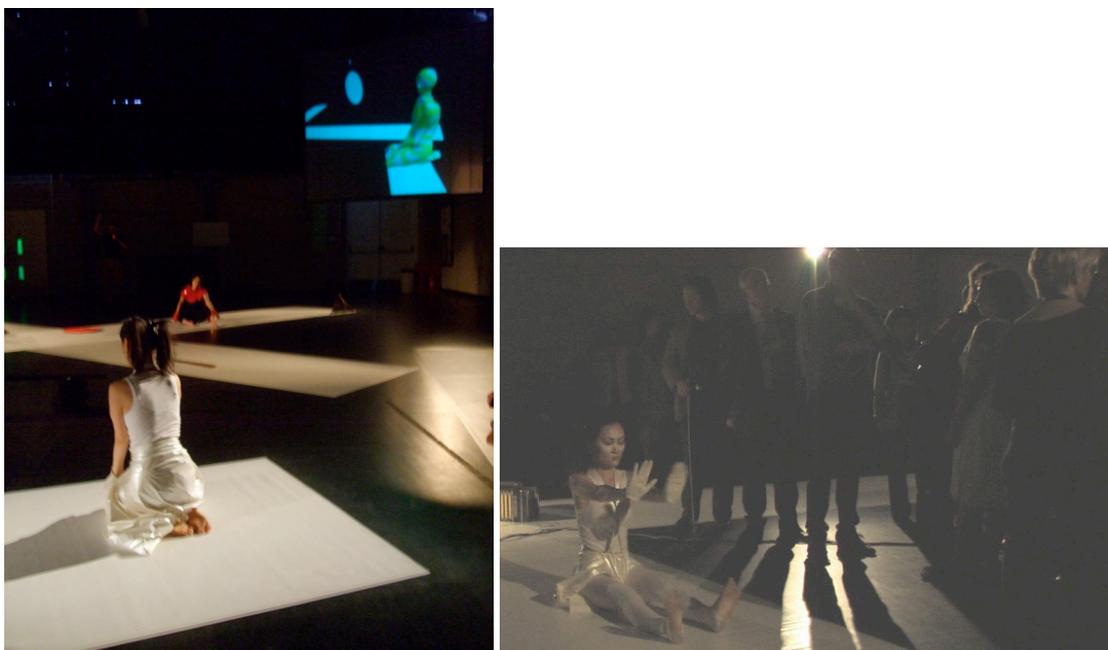


Fig.7 Anne-Laure Misme & Helenna Ren with speaker dresses in UKIYO (rehearsal)
© 2009 dans sans joux

In our new production, *UKIYO (Moveable World)*, which we began to develop in 2008-09, we expand this concept of spatialization further by focussing on the membranes of wearable mini-speakers, the small fluttering of electrical energy pulses, attached to the garments or to the skin, amplifying sound originating from the performer or mediated through the performer. We are also working with the scenographic concept of a choreographic installation with five criss-crossing hanamichi, opening the space up for audience movement across. In the complex feedback environment we are building (which includes live networked link-up to Second Life), the performer is interacting with the mediated environment of acoustic, visual, light and color projections constituted in continuous feedback loops with signals generated through electro-physiological data (vital data like breath, pulse, voice and sensorimotor data interfaced with computer algorithms which process sound modulations). In neurophysiological feedback environments, as I have written elsewhere, such real-time composition concentrates less on semiotic processes of sense-making but on the immediate physical and emotional experience of movements

inside or on the body (Birringer 2008). We think of this work as having a transcendental dimension, linking the internal processes of the nervous system and the organism to the spatial environment and its extended networked (virtual) world, as in *UKIYO* we transmit the movement to avatars in Second Life, and reinform the dancers' movement through avataric choreographies that are multifariously poetic, unrealistic, lossy, phantomic (they are inspired by 17th century haikus and created by software). In *UKIYO*, the performers revel in the auditory connection to virtual movements of phantom images, the membranes of the amplified bodies reverberating against the shadowy silhouettes of the visitors moving in the space, the space as



Figs.8 & 9 Helenna Ren and Katsura Isobe with avatar in UKIYO © 2009 dans sans jox

a whole becoming a “social” choreography of resonances in a floating environment. In the third part of *UKIYO*, the *zaum* poetry of the Russian avantgarde (Kruchenykh), voiced by Caroline Wilkins wearing a golden dress pleated like her bandoneon, mingles with the computer voice-activated Japanese haikus, in a floor-bound movement sequence that fuses the “unnatural” body extrusions of the avatars with live onomatopoeia, combining voice and electronics through wired loudspeakers attached to front and back of bodies. Here we enter the realm of an ecstatic audiophonic world, birds fallen from the sky, their intimate calls rebounding from the white strips, their organisms – those with weight, those which rotate, those which shuttle, interpenetrate and interact with one another – producing but the semblance of

community. Their avatars are projected onto suspended screens, and the avatars move around in a simulated model of our set. Naturally, we were not sure whether the smooth translation between the virtual/digital and the physical was believable. Learning to move like an avatar, we wanted our audience to enjoy the irony of seeing Second Life as a modeling of a future theatre.

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