***Ecce techno,* or, Suiting the biomechanical platform:**

immersion and contemporary embodiment

by

Anne Cranny-Francis

Critical & Cultural Studies, Macquarie University

In September 2006 I attended the Designplus workshop. "How Smart Are We?" in London, where a series of speakers discussed the development of Smart Textiles. Some spoke about the textiles themselves and their uses; others about the design processes they enabled or necessitated, and the opportunities they opened up for new kinds of clothing that is more wired in (literally) to contemporary western society. Still others talked about the new world of the twenty-first century – 'the emotional age', 'the feminine age', 'the conceptual age', the age of 'high touch' products. This is the age of Macs and iPods, of Virgin, YouTube, MySpace and Flickr – user-centred products and practices. We heard that BP had changed its logo to project a 'green' image and altered the wording of its advertising to project a softer, more caring ethos. We didn't actually hear that BP had altered its practice. Nor did we hear how the twenty-first century was going to become 'feminine', though we did learn that this meant warm, curved lounges in the Virgin Club at International Airports. One might almost be forgiven that this is the age of snake-oil salesman, until two speakers with very different agendas said their piece.

Physicist and Professor of Forecasting and Innovation, James Woodhuysen expressed a scientist's view that innovation does not come from user experience or new ways of assembling old ideas; it comes from scientific and technological research. He dismissively noted that more students want to do Media Studies than Science at university (in Australia the demon would be 'Cultural Studies'), hence the proliferation of audience and user research, rather than hard science. Though, ironically, in demonstrating the role of technology in the generation of knowledge, he relied on a user/audience example: "Google developed our talents – it didn't just serve our needs." (Woodhuysen 2006) Woodhuysen's argument is useful in that it intervenes in a 'user-centred' perspective that elides the politics of the text or practice with which the user engages. Instead, for his own reasons, Woodhuysen drew us back to the application, and asked what it does; what it achieves; how it expands or

intensifies our engagement with the world. And by arguing that innovation is not about putting old ideas together, he specified an important distinction between technology and its applications. Which is that users may understand the application of a technology by relating it to their previous experience, but the technology itself may be new – and the application of the technology may then engage users in a new way with the world around them.

The other speaker whose contribution brought proceedings to a momentary hush was Major Silas Suchanek from the Ministry of Defence (MOD). The Major talked enthusiastically about the range of materials and applications required by the MOD to suit 'the biomechanical platform' (Suchanek 2006). Realizing at one point that certain members of the audience (including myself) were gazing at him in some puzzlement, the Major explained that "the biomechanical platform" is what they, in the MOD, call the contemporary soldier. A momentary disquiet breezed through the vaguely left-liberal audience of design professionals, until the major announced that the basic order at the MOD was about 200,000 units. At which point Blackberries were flourished, notebooks appeared, and hands were raised, with questioners asking when the tenders were to be announced.

In their different ways Woodhuysen and Suchanek provided a challenge to much of the uncritical enthusiasm that accompanied the discussion of user-orientation and participatory design. For despite the exhortations of the Chair, Rob Holdway (of Giraffe Innovation) that the underlying theme of the day should be 'Ethics', there was little or no discussion of same – and no attempt to devise a conceptual basis for the ethical evaluation of these new processes and products. Rather it seemed that the only aim was that users should be made to feel comfortable, cared for and creative. None of these are bad aims in themselves, of course; however, that they constitute an ethics of design is highly doubtful. So Tom Savigar's description of the twenty-

first century as 'feminine' on the grounds that it would not be rationally driven, but would be sensitive to the feelings of consumers, reproduced not only rather hoary stereotypes, but also rather whore-y stereotypes. It seemed about as far from an ethical critique as one could get.

The most exciting feature of the day was the description of new products and processes, of new design practices, and of the possibilities for new ways of being. And it is in this context that the question of ethics – or perhaps more directly, of politics – might have been productively raised, beginning with the relationship between technology and being and the extent to which we are always, as contemporary social subjects, immersed in the technology of our society. We incorporate that technology in various ways but also make certain choices about whether or not, and how, to use/immerse ourselves within particular applications.

This paper explores the politics of immersion in new technologies and their applications, identifying the ways in which the technology of a society operates as a somatic technology – either challenging conventional notions of embodiment and being or reinforcing those conventional ideas (often by a reassertion of the mind/body split and its consequences for everyday life). It also considers the politics of immersion in a personal space (idioscape) created by individualised use of those applications, with particular reference to personal music systems.

I.   Immersion

As western citizens in the early twenty-first century we constantly negotiate a range of technologies – the silicon based information technology that drives our home computers, MP3 players, digital entertainment systems, many current automotive applications; biotechnologies that are increasingly a part of contemporary health-care; electronic technologies that inform many new materials and designs. In

negotiating these technologies we are effectively disciplined in the ways of our society; trained to be compliant subjects. Yet at the same time, we may resist that training – either instinctively (unreflexively) or deliberately (self-reflexively) – so that the negotiation incorporates values, beliefs and feelings that are typically our own (that is, constitute our own particular configuration of contemporary discourses).

In other words, we might argue that we are immersed in a range of technologies, each of which positions us in particular ways – to hold particular values, feel and think in particular ways – in order to use them as the makers devised. The interesting feature of many technological changes is, of course, that users do not comply with the makers' specifications but find new and different ways to incorporate the technologies into their lives (e.g. Vogiazou et al on-line, discussing ways of designing for this user behaviour; Kahn and Kellner (2004) on internet activism). We are not Cybers or Borg – the incorporated beings of *Doctor Who* and *Star Trek* whose individuality is lost when they become part of the technological infrastructure of their society. Or are we?

'Immersion' is derived from the word '*mergere*' – to dip. Implicit in the word is the notion that we can be not-dipped; that we can choose to be separate from the medium in which the dipping takes place. My argument is that we are always, already dipped, immersed, in the technologies that constitute our world. This makes it crucial that we develop ways of understanding the values, beliefs and feelings assumed in and by these technologies and their applications, which they subsequently position users to incorporate. In other words, how they operate as somatic technologies to produce us as certain kinds of citizens. And it is only by understanding those technologies and applications critically that we are able to explore the social world they create for us – and the politics mobilizing that world. Which in turn makes sense of the individual immersive environments – idioscapes –

that individuals create in order to resist the somatic technologies of their world. Here

I am thinking particularly of the use of iPods and other MP3 devices to create a

personal soundscape to effectively insulate the user from the surrounding

environment (Bull, 2000; de Nora, 2000) – to mediate its somatic impact and

disciplinary function, though at the same time they create their own disciplinary

regime and demands. In the case of the idioscape, of course, we are also dealing

with a voluntary immersion in the application of a technology, for reasons specific to

users, which carries its own ethical consequences.

To explore the ethics of our immersion – voluntary and otherwise – in the new

technologies that characterize our twenty-first century western environment, we need

to begin by noting the somatic politics of a society's technologies.

II.   Ecce

When Pontius Pilate offered the beaten Christ, crowned with thorns, to the jeering

crowds outside his palace, he proclaimed him with the words, 'Ecce homo' – behold

the man. His apparent intention was to demonstrate that justice had been metered

out to this rebellious young man and that no further punishment was necessary. His

ploy did not work, and Christ was further brutalized and eventually killed. What

Pilate's words identified was the juridico-political apparatus of the state, as it

operated on the body of its citizens. In Foucault's terms this was 'monarchical

punishment', a form of punishment that violently marked the body of the citizen so

that she or he was an embodied example of state (official) retribution.

In *Discipline and Punish* (1991) Foucault traces a move in forms of penal control from

monarchical punishment to disciplinary punishment. This was less about the violent

display of state control than about the coercive 'rehabilitation' of the prisoner, often

through techniques of mental and/or sensory manipulation: for example, by using

sensory deprivation techniques (white-washed cells and physical isolation) to re-educate prisoners; to turn them into compliant subjects.

Developing this thesis led Foucault to his notion of a 'carceral continuum' running throughout modern (western) society, whereby social control is embedded in the embodied experience of everyday life. Effectively, contemporary subjects learn to discipline themselves, in deference to the implied surveillance of a disciplinary regime that demands their compliance with mainstream 'norms' of behaviour, thought and feeling. Which is not to say that all do comply; however, a price is paid for non-compliance.

Within western societies that price, and the disciplinary regime that demands it, is usually not as visible or as marked as the torture and killing of Christ (though, since the publication of images from Abu Graib, western involvement in such practices in other (non-western) spaces can no longer be denied). Within the western body politic, individual citizens incorporate the practices, beliefs and feelings that enable them to negotiate their everyday experience, and in the process re-produce themselves as (disciplined) embodied subjects. The nature of that incorporation is related to the social and cultural practices that characterise the society at a particular time.

III. Techno

Since the beginning of the nineteenth century, industrial technologies (from steam to silicon) have characterized the nature and practice of western societies – and so of its citizens (Cranny-Francis 1995, 2005). That is, the embodied subjects of western society have incorporated, literally, the technologies that characterize their society – whether that means negotiating the dangerous factory workspace of the early

nineteenth century or receiving a bionic medical implant in the early twenty-first century.

In Heidegger's terms these technologies function potentially as a bringing-forth or revealing, but in practice are often instrumentalized as a form of ordering, so that they delimit human being rather than illuminating it (Heidegger 1993). Effectively, they operate as a mechanism of discipline, ordering human embodiment to comply with the demands of an instrumental logic. This logic is what Bruno Latour describes as 'mind-in-a-vat' thinking – a notion of disembodied consciousness that he believes has severely restricted the practice of science by isolating it from the social, cultural and political context within which it operates (Latour 2003). In this instrumental form technology subjects the individual to the requirements of the process in which it is involved. In the nineteenth-century William Morris wrote that factory workers had been reduced to the "hands" of the machine, no longer skilled workers in their own right. So just as Heidegger saw the river, Rhine reduced by modern technology to a 'water-power supplier", for Morris the Victorian factory-worker is reduced to a "hand-power supplier". This is not the only determinant of the factory-worker's being, of course, but it does have repercussions for all aspects of her/his life. In other words, it is incorporated as a form of somatic technology, most obvious in the injuries suffered by some operatives of dangerous machinery but also apparent in the general health and well-being (or lack thereof) of workers. The critical factor here is that the worker's overall being is not considered, only its effectiveness as part of the hybrid complex that is the worker+technology.

However, technology may also be a bringing-forth or revealing. So its incorporation by the individual may be part of a process of revealing or deconstructing the nature of being. In a sense, we might argue that even the somatic technology of the nineteenth-century factory floor is a revealing or bringing-forth – not of any positive or

creative aspect of the worker-technology relationship or of the being of the worker, but of the instrumental logic of that workplace and its disregard for the integral being of workers. Or we might consider the bionic ear implant, a medical technology designed to enhance the lives of recipients. It reveals the values that mobilize the health system – the desire for 'normal' hearing, which further reveals the inability of the society to provide alternative and equally rich modes of communication for those with non-normative hearing.

In other words, the technology used by a society and the way its use positions its citizens/users tells us a great deal about the nature of that society – the values that are fundamental to it, and which it mobilizes through its political and juridical structures and practices.

IV.   The Hug Shirt and the Touch Lab

One of the inventions listed as a finalist in the Time Magazine Invention of the Year competition for 2006 was CuteCircuit's Hug Shirt. It didn't win (the winner was YouTube (Grossman 2006)), but the nomination in itself is sufficient notice of the social and cultural, as well as technological, importance of this application.

Fig. 1: CuteCircuit's Hug Shirt, viewed at http://cutecircuit.com/pictures/album/the-hug-shirt-fr-hugs/page/1/photo/shot4, accessed 21/10/2006

The CuteCircuit web site (www.cutecircuit.com) describes the Hug Shirt in this way:

> The Hug Shirt is a Bluetooth accessory for Java enabled mobile phones. Hug shirts don't have any assigned phone number, all the data goes from the sensors Bluetooth to your mobile phone and your mobile phone delivers the hug data to your friend's phone and it is seamlessly transmitted Bluetooth to his or her shirt! Sending hugs is as easy as sending an SMS and you will be able to send hugs while you are on the move, in the same way and to the same places you are able to make phone calls (Rome to Tokyo, New York to Paris).

> The system is very simple: a Hug Shirt (Bluetooth with sensors and actuators), a Bluetooth java enabled mobile phone with the Hug Me java software running (it understands what the sensors are communicating), and on the other side another phone and

> another shirt. If you do not have a Hug Shirt but know that your
>
> friend has one you can still send them a hug creating it with the
>
> HugMe software and it will be delivered to your friend's Hug Shirt!
>
> …
>
> When touching the red areas on your Hug Shirt your mobile
>
> phone receives the sensors data via Bluetooth (hug pressure, skin
>
> temperature, heartbeat rate, time you are hugging for, etc) and
>
> then delivers it to the other person.

This application uses current technologies – mobile communications, wearable technology – to create a new way of experiencing contemporary embodiment. CuteCircuit explain the reasons for their application in this way:

> The Hug Shirt is not meant to replace human contact, but to make
>
> you happy if you are away for business or other reasons and you
>
> miss your friends and loved ones! It also has some very
>
> interesting applications in the medical field with the elderly and
>
> children. And is fun to use and very soft!

In this statement CuteCircuit differentiate between actual, physical human contact and the simulation of touch with the Hug Shirt. Nevertheless they claim that their invention can generate the emotional response ("make you happy") associated with its 'real', physical correlate. And this is underlined in that paragraph by the concluding 'touch' word, soft. When CuteCircuit discussed their invention at the Designplus symposium, they referred specifically to its use by partners; where partners who are geographically separated can recall each other's embrace by simulating it via the Hug Shirt. In this example, the virtual touch has the memory of a physical touch to work with and from. In a sense the simulation might be seen as reactivating a body memory that already has an emotional component for those

involved.

With this in mind the most provocative sentence in the CuteCircuit description of the Hug Shirt is the embedded one, referring to the use of the shirt with "the elderly and children". It is possible that the same situation applies, that the Shirt will activate already existing body memory. However, the dystopian (*Brave New World*) scenario also needs to be considered – that the Shirt actually might be seen as somehow replacing physical contact. Earlier this year a news report about touch fabric developed by the MIT Touch Lab noted that one application of the fabric might be for office workers. That a parent could sit in their office with a computer screen on which one window shows a baby in a crib, with a blanket made of touch fabric. If the baby cries, the story suggests, the parent/guardian can simply activate the fabric via the computer to touch the baby – stroking it back to sleep.

This scenario begs many questions about the relationship between embodiment, virtuality, memory and emotion. Research has shown that touch is essential to emotional development, and the touch that is the subject of this research is actual human physical contact – with its own specific warmth, pressure, movement and its associated smells (Montagu 1978; Davis 1999; Field 2001). It remains to be seen whether a baby would be comforted simply by electro-mechanical movement or, if so, what role that touch would have in their somatic formation. In other words, would a widespread use of such devices generate new forms of embodiment, less dependent on human physical contact – and how would that relate to the child's emotional and intellectual development?

At the Designplus symposium Sharon Baurley (of CSMCAD, the University of the Arts, London) also discussed her experiments with another example of interactive clothing, which used sensors and actuators to simulate various kinds of touch and which could also be activated by mobile phone. In particular, she discussed the responses of participants in the experiments, one of whom noted:

> Just the fact that you are linked, you are communicating and you are linked through several senses. If you are facing someone you have visual, tactile, spoken word, etc. And when you are remote you can't see that person all you have is text, spoken word, but if you can see things are happening to this person at the other end, you feel closer to that person.(Baurley 2006)

This response makes a slightly different point, that the effectiveness of the application is, at least in part, due to its inclusion in a communication practice – not that it, alone, constitutes a communication. So the sensory stimulus is seen as powerful because it is implicated in the "linking" of people together, not as an end in itself. And the same implication can be drawn from the CuteCircuit text; that the power of the Hug Shirt is not in the experience for the monadic individual, but for its role in the relationship between people.

This understanding of the technology and its applications differs markedly from the mechanistic understanding of touch used by the MIT Touch Lab to represent its methodology:
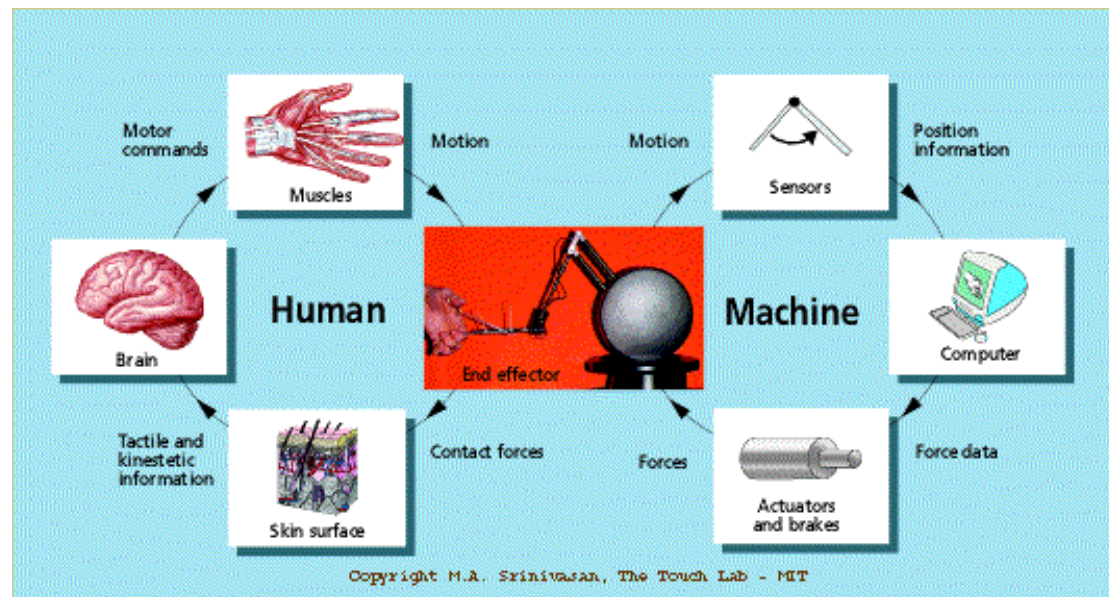
Fig. 2:   MIT Touch Lab diagram viewed at
http://touchlab.mit.edu/oldresearch/index.html, accessed on 21/11/2006

The striking aspect of this diagram for a cultural theorist is that the 'Human' side of the interaction is configured as a series of electrical and mechanical impulses and responses, without any reference to the social and cultural. The assumption is that there is no cultural and social mediation of the electrical impulse received by the brain and transmitted to the muscles. In fact, it is possible to place another organic life-form at left – say, a cow – and have the same elements present – skin, brain, muscle. Yet it is highly doubtful whether a human and a cow would have the same response to stimulation by the 'Machine'. The reason for the difference, I would argue, is not physical but cultural and social; cows and humans do not interact with the world in the same way and their experience of touch is quite different – because of the cultural and social meanings already embedded in the experience of touch for humans (and perhaps, differently, for cows!).

CuteCircuit present a similar view, by reference to the necessary 'emotional' connection between humans and technology:

> Interfaces and systems must be intuitive, natural, and compatible
>
> with our emotional status. Combining emotion and technology

should be part of every design process. An increasing mobility of

humans throughout the globe, due to business or study reasons,

has brought family members to spend most of their time apart

from each other. Humans need physical contact with each other.

Technology should allow for a pleasant Human-Human

Interaction.

This notion of compatibility with 'emotional status' refers the CuteCircuit

philosophy to the plethora of user/audience research discussed by Tom

Savigar (http://www.thefuturelaboratory.com). CuteCircuit describe their

design philosophy as combining technology and emotion, acknowledging the

more than electromechanical nature of human interactions – with each other

and with machines. Yet it is still important to interrogate the role of emotion in

this design process and its products. Is this simply a sop to consumers, a

more effective way of marketing products – or does it reconceptualise human

embodiment and being, unlike the mechanistic models used by organizations

such as the Touch Lab? The CuteCircuit web site continues:

Adults, especially elderly people living far away from their families,

deprived of tactile contact for a long period of time will tell you just

how depressing it feels. A hug, a handshake, a pat on the back,

and a kiss are all very important and bring us close to others.

People need to be touched at least 70 times a day! Start noticing

how many times you shake hands or hug a friend, and you will

see that it really makes you feel good, and if you didn't get enough

hugs give us a call and come visit!

This is one of the most positive views of the CuteCircuit project, that it enables the

necessary human contact that people might otherwise lack. In doing so, it argues for

an understanding of embodied being that includes the emotional and the sensory, not just the intellectual. So CuteCircuit's philosophy can be seen as directly confronting the rationalistic notion of human being that prioritizes the mind: the Hug Shirt is a contemporary response to Descartes!

Embracing the Hug Shirt (so to speak) may be seen as a voluntary immersion in a technological re-definition of embodied being that conflicts with the assumption implicit in much of the technology of our society that consciousness is a mental or intellectual construct. In this sense the Hug Shirt operates as a bringing-forth or a revealing, a technological synergy between technologies and users that constitutes an interrogation of rationalist modes of thinking and being. By contrast the MIT Touch Lab diagram argues a different – less engaged, not connected, not 'linked' – understanding of embodied being, which is a consequence and result of rationalist thinking.

V.   Future Warrior, or The Biomechanical Platform

It is this rationalist thinking that seems to mobilise much of the thinking about technologies used to outfit the contemporary soldier. Whatever the merits of the applications involved, the shock-point for many participants at the DesignPlus symposium was, as noted earlier, the terminology used by the speaker to describe the soldier: "the biomechanical platform." With this description the speaker identifies the soldier as/with the operating system of a computer – a wholly rationalist construct, whose embodied being is of interest only in that its military effectiveness can be maximised. That is, with this application the individual's sensory responses are subject to her/his military deployment and the application is designed to maximise them in relation to the immediate project, not to the needs of the soldier as an individual.

Fig. 3: Future Warrior Uniform, as imaged by the U.S. Army Research, Development and Engineering Command (Provisional), viewed at http://www.rdecom.army.mil/rdemagazine/200309/itl_future_warrior_uniform.html, accessed 21/11/2006

This is not to say that the individual soldier, once placed in the situation for which the applications were designed, may not benefit from them: for example, applications in development include smart fibre uniforms that relay medical data about the soldier to a command post, enable vital signs to be monitored, send signals via satellite to locate a wounded soldier, (Valigra 2002, Jewell 2006, Suchanek 2006) and, as with the CSIRO's nanotube materials, "act as electrically driven muscles, contracting around a wound to prevent further blood loss" (Adams 2005: on-line). However, there is little sense in which this Future Warrior technology interrogates the kind of society for which such applications – and such a role – are necessary.

This seems a classic case of Heidegger's "standing reserve" where the aim is not a bringing forth of the potential of the soldier through the technology, but a transformation of the soldier into the most effective "military-power supplier". The bringing-forth or revealing associated with the technology in this case is its revelation of the instrumental deployment of technology. By which I mean that the technology, via its applications, is designed to meet a specific purpose to which the human participant is subject, a component in the process rather than the focus of that process. This is reminiscent of Bruno Latour's argument against the decontextualisation of science:

> We tell scientists that *the more connected a science* is to the rest of the collective, *the better* it is, the more accurate, the more verifiable, the more solid… – and this runs against all the conditioned reflexes of epistemologists. When we tell them that the social world is good for science's health, they hear us as saying that Callicle's mobs are coming to ransack their laboratories. (Latour 2003: 134)

So Latour argues that science works most effectively when it is not narrowly focused on a specific objective, but rather when its aims and objectives are placed within the context of the social order within which it operates – and, effectively, is immersed. However we configure the relationship between science and technology (see, for example, Ihde 1993), I would argue that technology, too, works best when it is clearly connected to the society – and people – for whom it is designed.

Again, the value of the Hug Shirt and of Sharon Baurley's work on wearable textiles is that they engage fully with the people for whom they are designed, immersing themselves in the culture(s) of those users. And this participative

design practice is not simply an avoidance of hard science (*pace* Woodhuysen), but rather is an attempt to write what Latour calls "the social world" into the development of new technologies and new applications. The Future Warrior technologies and applications are disturbing because they are removed from the social world, ghettoised in a sub-culture that is preoccupied with violence and conflict. They do not enhance linking or connection between human beings through the use of technology, but rather transform the human into a technological component ("biomechanical platform") so that he/she/it can be integrated into a military practice. Again, this thinking derives from older conventional models of human embodiment that deny the complex nature of human embodiment and focus on the intellect in a way that is often seen in early virtual reality games and literature.

VI.   Idioscapes: individual immersion

The final part of this analysis concerns the immersion of individual users in personal environments – idioscapes – created with the use of contemporary technologies. There are homologies between this practice and the virtual reality experiences of many early users – as portrayed by Case in William Gibson's *Neuromancer* (1986): the users for whom the body is "meat", "wet-ware". Their VR world was an escape from the tedium of the everyday into a private world in their heads, an idioscape. Contemporary users make a similar use of some current technologies to achieve a similar end. Currently, wearable textiles are not quite at this point in their development, but we have seen this already in the use of personal stereos and then MP3 players (particularly iPods) to create a personal soundscape.

Michael Bull (2000) and Tia de Nora (2000) described the use of the personal stereo to create a sonic environment that insulated the user from the surrounding

environment. Drivers know this phenomenon well; never have so many

pedestrians thrown themselves so obliviously into the way of moving vehicles!

As Bull and de Nora showed, personal stereo wearers use the device to create

their own world in which they do not have to engage with others if they do not

wish, and in which they feel insulated from many common social pressures (to

look or act in particular ways). So the personal stereo can function as a

mechanism of resistance, enabling the wearer to choose not to dip themselves in

the social world around them. Essentially the idioscape operates as a (personal)

space of resistance to conventional social and cultural forces – enabling the user

to resist immersion in the everyday life of the society.

The other possibility with this form of resistance is that it becomes a form of

radical individualism, disavowing any connection with others – a kind of extreme

distraction. This can work against the kind of connection that one user (in

Baurley's experiments) specified as the source of greatest satisfaction with a new

application. Instead of using the technology and its applications to immerse

oneself in the embodied experience of a society with a technology that engages

with the sensory, the user deploys a sensory engagement to avoid immersion –

and the politics that necessarily results from social and cultural engagement.

This effectively constitutes a reiteration of rationalist thinking and of the

mind/body split, with the technology deployed to service the 'body', which is

disengaged from a holistic experience of embodiment.

VII.   Immersion and contemporary embodiment

It should not be assumed that any sensory experience is necessarily socially or

culturally engaged, nor that any reference to users is necessarily deconstructive

of conventional ways of thinking and being. Moving to new ways of

understanding embodied being and the world around us actually requires not

simply immersion in the senses (haven't people done that in various ways for millennia?) but a way of understanding and interrelating the senses, the technologies through which they are experienced, and the connection to others that is the basis of social life – multiple immersions, each with its own demands, possibilities and politics.

These include the somatic politics of the technologies that characterise a society: how we are necessarily immersed in this technology, and how it positions us as embodied subjects. It also includes our immersion in technological applications, which again position us in specific ways as embodied subjects – as interconnected, embodied beings (the Hug Shirt) or as biomechanical components of a machine (Future Warrior). And it includes the individual immersive environments or idioscapes by which individuals attempt to insulate themselves from other aspects of their social immersion, and which may operate as spaces of resistance or of distraction.

The final word should lie with Sharon Baurley's participant whose succinct statement about the experience of wearable technologies draws together the necessary components of any analysis of contemporary technologies and their applications – the technology itself, the applications, the experience of the user, and the role of the technology in facilitating human interactions: "Just the fact that you are linked, you are communicating and you are linked through several senses." (Baurley 2006)

Bibliography

Adams, David. (2005) "Smart Cloth for Cutting-Edge Tailors." *Solve: A CSIRO Review of scientific innovations for Australian industry,* Issue 2 (Feb.), viewed on-line at http://www.solve.csiro.au/0205/article9.htm, accessed 3/12/2006

Baurley, Sharon. (2006) "The user as focus and inspiration for smart innovation." Unpublished paper, "How Smart Are We?" Symposium, RIBA, London, 15 September.

Bull, Michael. (2000) *Sounding Out the City: Personal Stereos and the Management of Everyday Life.* Oxford & New York: Berg.

Coyne, Richard. (1998) "Cyberspace and Heidegger's pragmatics." *Information Technology and People,* Vol. 11, Issue 4.

Cranny-Francis, Anne. (1995) *The Body in the Text.* Melbourne: Melbourne University Press.

Cranny-Francis, Anne. (2000). "The erotics of the (cy)Borg: authority and gender in the sociocultural imaginary" in *Future Females, the Next Generation: New Voices and Velocities in Feminist Science Fiction*, ed Marleen Barr. Rowman and Allenheld, 2000, pp. 145-63.

Cranny-Francis, Anne. (2000). "Connexions." In D. Gibbs & K. Krause (Eds.) *Cyberlines*: *the Languages of Cyberspace* (123-48). Albert Park, Vic: James Nicholas Publishers.

Davis, Phyllis K. (1999) *The Power of Touch - The Basis for Survival, Health, Intimacy, and Emotional Well-Being*. Carlsbad, CA: Hay House Inc.

Deleuze, Gilles and Felix Guattari. (1987) *A Thousand Plateaus: Capitalism and Schizophrenia.* Brian Massumi (trans). Minneapolis & London: University of Minnesota Press.

DeNora, Tia. (2000) *Music in Everyday Life*. Cambridge: Cambridge University Press.

Featherstone, Mike & Roger Burrows (1995) *Cyberspace/cyberbodies/cyberpunk: cutlures of technological embodiment.* London: Sage.

Feenberg, Andrew and Alastair Hannay, eds. (1995) *Technology and the Politics of Knowledge.* Bloomington; Indiana University Press.

Ferré, Frederick. (1995) *Philosophy of Technology.* Athens & London: University of Georgia Press.

Field, Tiffany. (2001) *Touch.* Cambridge, Mass.: MIT Press.

Foucault, Michel (1980) *Power/Knowledge.* NY: Pantheon.

Foucault, Michel. (1991) *Discipline and Punish: The Birth of the Prison.* Tr. Alan Sheridan. London: Penhguin.

Gibson, William. (1986) *Neuromancer.* London: Grafton.

Grossman, Lev. (2006) "Best inventions 2006." *Time,* viewed on-line at http://www.time.com/time/2006/techguide/bestinventions/inventions/youtube2.html, accessed 4/12/2006.

Haraway, Donna. (1997) *Modest_Witness@Second_Millenium.FemaleMan©_Meets_OncoMouse™* N.Y. and London: Routledge.

Hayles, N. Katherine. (1999) *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics.* Chicago: University of Chicago Press.

Hayles, N. Katherine. (2002) "Flesh and Metal: Reconfiguring the Mindbody in Virtual Environments", *Configurations,* 10: 297-320.

Heidegger, Martin. (1993) "The Question Concerning Technology" in Basic Writings. From Being and Time (1927) to The Task of Thinking (1964), ed. David Farrell Krell, London/New York: Routledge, pp. 311-41.

Howes, David. (2005) Empire of the Senses: The Sensual Culture Reader, Oxford: Berg

Idhe, Don (1990) *Technology and the Lifeworld: From Garden to Earth.* Bloomington: Indiana University Press.

Ihde, Don. (1993) Philosophy of Technology. An Introduction, New York: Paragon House

Jewell, Lorie. (2006) "Year 2025: Army's Futuristic Uniform." *Military.com*, viewed at   http://www.military.com/soldiertech/0,14632,Soldiertech_FutureUni,,00.html, accessed 3/12/2006

Kahn, Richard and Douglas Kellner. (2004) "New media and internet activism: from the 'Battle of Seattle' to blogging." *New Media and Society*, Vol.6 (1), 87-95.

Latour, Bruno. (2003) "Do You Believe in Reality? News from the Trenches of the Science Wars?" in Robert C. Scharff and Val Dusek (eds), *Philosophy of Technology: The Technological Condition. An Anthology.* Oxford: Blackwell, pp. 126-37.

Montagu, Ashley. (1978) *Touching: The Human Significance of the Skin.* N.Y.: Harper & Row.

Suchanek, Silas. (2006) "MOD battle apparel." Unpublished paper, "How Smart Are We?" Symposium, RIBA, London, 15 September.

Valigra, Lori. (2002) "Fabricating the Future." *The Christian Science Monitor,* August 29, viewed at http://www.csmonitor.com/2002/0829/p11s01-stgn.html, accessed 3/12/2006

Vogiazou, Yanna, Josephine Reid, Bas Raijmakers and Marc Eisenstadt. (on-line) "A research process for designing ubiquitous social experiences." Viewed at http://www.hpl.hp.com/mediascapes/paper199.pdf, accessed 4/12/2006

Woodhuysen, James. (2006) "Smart trends and drivers: technology and textiles convergence." Unpublished paper, "How Smart Are We?" Symposium, RIBA, London, 15 September.