

[Mission](#) :: [Archives](#) :: [Contribution](#) :: [Production](#) :: [StudioXX](#) :: [log in](#)

## DPI: la revue électronique du Studio XX Electronic Review::

### > In the Shadow of the Cyborg an interview with Joey Berzowska by Jake Moore ::

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Spotty dresses - photos Vincent Leclerc

#### Dans l'ombre du Cyborg

Résumé de l'entrevue de Jake Moore avec Joey Berzowska

Joanna Berzowska est assistante-professeure en Design Art and Digital Image/Sound à l'Université Concordia et chercheuse en textiles interactifs à Hexagram (Institut de recherche et création en arts et technologies médiatiques). Son travail et ses recherches sont essentiellement reliés au calcul léger (soft computation), aux textiles électroniques et aux technologies portables. Initiée aux médias tangibles aux laboratoires du MIT (Massachusetts Institute of Technology), Joey travaille à faire des vêtements intelligents qui sont des outils d'expression et de communication plutôt que des exosquelettes ou des armures. Restant à l'écart des composantes rigides autant que possible, elle détourne des technologies et des matériaux développés à des fins militaires, aérospatiales et industrielles, afin de tisser des interfaces souples et ludiques jouant avec les notions de l'intimité, de l'histoire de l'utilisation des technologies numériques et de la séduction redoutable des technologies de surveillance.

#### Abstract

Joanna Berzowska is an Assistant Professor of Design Art and Digital Image/Sound at Concordia University in Montreal and researcher in the Interactive Textiles Axe of Hexagram (Institut de recherche et création en arts et technologies médiatiques). Her work and research deal primarily with "soft computation", electronic textiles and wearable technology. Introduced to tangible media at the MIT lab, Joey concentrates on making wearables into tools for expression and communication rather than exoskeletons or protective structures.

EDITIONS ::

**Dans ce  
numéro :  
In this  
Issue :**

#### Intro

[Le Retour du  
Cyborg](#)

[The Cyborg  
Returns](#)

[A l'avant  
plan /  
feature](#)

[> Aître ou ne  
pas Aître,  
question  
d'architecture.  
Par Marie-  
Christiane  
Mathieu](#)

[> Many Happy  
Returns!  
by Sheryl N.  
Hamilton](#)

[> Longue vie  
et meilleurs  
voeux ! Par  
Sheryl N.  
Hamilton](#)

#### Interview

[> In the  
Shadow of the  
Cyborg  
an interview  
with Joey](#)

*Staying away from hard components as much as possible and weaving conductive yarns and the like, she re-purposes materials and technologies, often made for military, aerospace and industrial uses, to create playful soft interfaces (or shware) which toy with notions of intimacy, history of use in the digital realm and the seductive dangers of surveillance technologies.*

**Berzowska  
by Jake  
Moore**

Donna Haraway used Socratic irony to introduce the world to the Cyborg Manifesto and within it outlined a potential new site for feminist identity within the margins of the un-namable. She argues that the cyborg itself is a hybrid of the human and the machine and thus can claim no creation mythology. Without the desire to *return to the garden*, as outlined within Judeo-Christian and psychoanalytic mythologies, “the cyborg skips the step of original unity, of identification with nature in the western sense” \*: these new creatures would be free to self-define.

Seeking self definition is the goal here, as Haraway recognised the potential for “exclusion through naming” as well as the fluid nature with which most selves are in a constant state of becoming. Identity with nature had not served the female self well, locating the female body as being primarily fecund, grounded in a material and cultural world as early feminist strategies suggest that women had no hand in making. Cyborgs, on the other hand, “are ether- quintessence”.

The cyborg does not seek a solitary identity: “one is too few, and two is only one possibility, intense pleasure in skill, machine skill, which ceases to be a sin, but an aspect of embodiment”.

It is this fluid and multiple identity that Haraway suggests we code, and *code* seems so apt a description. In the binary code world of zeros and ones, it is the relation between the two digits and the speed with which we travel between them that allows any complex meaning to be made, command to be issued, or function to be perceived. Zero and one, or high and low, as states unto themselves, mean little. It is also suggested that it is in the digital realm that gender falls away, and that this could potentially provide the ultimate liberation (a notion too complex to take issue with here).

Haraway states, “Communication technologies and biotechnologies are the crucial tools re-crafting our bodies.”, but this is how it has always been within western culture. The pictogram, the tapestry, the written word, the code of language itself: each of these early technologies for communication cast and recast our identities for dissemination. The medicalization of pregnancy has cemented our bodies with a primary function, one that requires mediation, too precious to be handled ourselves. It is in *who* constructs these technologies and their products that make the difference; and identity can become amplified as well as *how* these choices have been made. Tapestry, text, and binary code all share a provenance in textiles as the origin of communication technology, and the metaphor of weaving travels freely through the digital realm and the Internet (i.e. world wide web). We must not let it stop at metaphor, instead fully acknowledge the lessons to be learned from the myths of Arachne, a master weaver turned to spider by the goddess Athena, cursed to be more body than head, without signature, and to spin forever more; Penelope, who un-wove every night what she wove in the day so that she might determine her own destiny and affinities, and perhaps most importantly, Ariadne, who provided the thread that could lead one out of the labyrinth. The labyrinth structure has stood in for society and/or language in the long and multiple histories of western thought from Greco-Roman mythologies to Heidegger; that a thread could lead us out of such a complex yet unicursal structure suggests the need to revisit the traditionally feminine modes of textile production and acknowledge communication technology within them.

It is now 13 years since the publication of *The Cyborg Manifesto*, the information age is flourishing and those claiming cyborg status are many and oft published, though very few with the intentions outlined by Haraway. There seems to be a core difference between those that would seek self-definition in aligning themselves with a creature without origin and those that seek to father the creature, and bolster (I would say deny) their leaky bodies. The cyborg revolution has led to a parallel arena known as wearable computing and its seeming sister discipline of electronic textiles. Practitioners are many and developments are fast. The union of zeros and ones with the matrix of warp and weft is a *natural* fit and an appropriate place to examine difference and to make material some of the affect of ether.

Here in Montréal at Hexagram, *Institut de recherche et création en arts et technologies médiatiques* <http://www.hexagram.org/> there exists an axis of research called *interactive textiles and wearable computing*. The researchers at the institute are made up of artists/practitioners from the Université du Québec à Montréal, Université de Montréal, and Concordia University. In the Interactive Textiles Axe are most notably , Barbara Layne, Ingrid Bachman and Joey Berzowska, all affiliated with Concordia. Recently I had the opportunity to speak with artist/researcher and axe chair, Joey Berzowska.

I predated our discussion with the theme that had been suggested by dpi. for this issue, the Cyborg, in recognition of Donna Haraway’s germinal work, *The Cyborg Manifesto*, and an interest in re-visiting its tenets and measuring its effects in an increasingly active feminist/feminine presence in the digital arena. I suggested it might be a bit old school...

Joey: I made the joke just 5 minutes ago that I haven’t read Donna Haraway and the *Cyborg Manifesto* in the ten-ish years since it came out and the only thing that I remember distinctly from it is the idea of embodied knowledge and how at the time it was so interesting to me as a young feminist. Then when I ended up at MIT I really started working with what was called physical computation or tangible media. See [glossary of terms](#)

Basically, tangible media deals with both representing digital or virtual data in physical ways but also using various physical interfaces as a way to generate digital or virtual data other than just with a mouse and a

keyboard. I started working in that field and wanted to work with the human body as a part of the whole equation of tangible media. Surprisingly the people that I was working with, most notably Hiroshi Ishii [<http://web.media.mit.edu/~ishii/>] – who is fantastic, has been a great mentor and a wonderful researcher – were really afraid of the body. He was really afraid of the notion of the body even though he had really pioneered this notion of tangible media. There is this joke that Bill Buxton [<http://www.billbuxton.com/>] tells in his lectures about the way that we conceptualise the computer. He says that if we ask somebody to draw a computer they will draw a screen and a mouse. They won't actually draw the computer; they draw the interface. So if you ask the computer to draw the human, the computer will draw one eyeball and three fingers, the clicking finger, and two more for typing, cause it's all that the computer perceives of us. Working in tangible media, I was really surprised that some of these tangible interfaces still use the same model of a human being, one eyeball – enough to see what is projected on surfaces or projected or constructed in the environment – and three fingers. So you touch something or push something or you roll something but really you're just using the eyeball or the hand and not really using the rest of the body. A lot of researchers in the fields of tangible/ physical computing and also wearable computing, which we will talk about in a second, are male and are embracing this thing (cyborgian strategies) and they are really terrified of the body.

Jake: In our earlier conversations I have brought up the JG Ballard quote that seems to have brought forward this term second skins:

*Fashion is the recognition that nature has endowed us with one skin too few, that a fully sentient being should wear its nervous system externally.*

Ballard describes this as fashion but many people designing wearables use the term second skins and some people use it to describe the interface of a wearable computational device – the more expressive fashion type or even the Steve Mann style [<http://wearingcam.org/steve.html>]. Often these are described as a hardened skin.

Joey: exoskeleton

Jake: Yeah, the defensible skin. It protects our skin. Even standard clothing defends our skin in a way, defends and displays.

Joey: Since you brought up Steve Mann, maybe I will just do a quick introduction to his work because he calls himself the world's first cyborg, which is appropriate for this issue, and at the same time his research is in the field of wearable computing. This is one of those instances where the cyborg idea involves having the computational device as an integral part of your body.

Jake: I think the primary definition of cyborg was of an assisted body but it has come to mean integrated, so more like the stelarc [<http://www.stelarc.va.com.au/>] approach of a built-in ear actually altering the body.

Joey: Well, Steve Mann and I overlapped at the media lab for one year, which is when I started getting to know him. Most of his research involved wearable computing and he is of the school where they define wearables as literally wearing the computer on your body. He in fact talks about his wearable computing as a building built for one inhabitant, which is a very political thing and a very protective structure kind of thing. But my perspective on it, which is shared by a lot of other women who work in this field and are interested in the more expressive aspects of what we put on our bodies, is that these wearable technologies are not these exoskeletons or these buildings that protect us, but tools for communication and expression.()

Jake: It seems that there is a persistent return to very modernist ideals. For one, that there is a lack within the existing human body that we must remedy, or at least assist – in the wearable technologies of Steve Mann it is about heightening the sensorial ability of an existing body. Also that we must not only increase our sensorial ability through mechanical means, but that we must also create a more defensible space with that. The architectural model of how we wear things. A building for one body harkens to Le Corbusier's idiom, "a machine for living". A century later it's like a mirror response that ultimately comes out to mean the same thing the body is a limited creature that we must somehow assist, but not so much to display points of sharing. In some of the more expressive cases, it is not so much about information exchange as affect exchange. And defining space in a very different way. It is more about self presentation as presentation, much more complex, and I would say mutable rather than fortress building. These notions of mutability are in fact where there is a real line down feminine or feminist practices that relate back to many early feminist writings about the fluid self and acknowledge our changeable way.

Joey: That's interesting because one of the things I focus on with my work is this notion of playfulness, which is something that I never thought of in the terms that you have just laid out, but I think it is an interesting extension of that. I talk a lot about the outfits I make as intimate and playful technologies, which is something Ann Galloway talks a lot about when discussing mobile technologies, ways of creating a space for intimacy and playfulness. Ideas that don't often come up in the more utilitarian-focused work.

Jake: Definitely not. But there has been a lot of heady analysis of the term play, even in Anne Galloway's blog (a must read [http://www.purselipsquarejaw.org/http://www.purselipsquarejaw.org/research\\_design/notes/play.html](http://www.purselipsquarejaw.org/http://www.purselipsquarejaw.org/research_design/notes/play.html)). Her interest in the user is a way of promoting access to technology for those who may have been intimidated by it. One of the things that is most interesting to me is that these women producing this kind of media are themselves theorising that the academic division (between practitioner/maker and theoriser/writer) doesn't really exist in this milieu as of yet. For example, Ann Galloway (doctoral candidate, author, etc), her interest is in the user; her job is to be a sponge and absorb all this information and make it shareable. On her site she suggests there is nothing playful about play. It is, like much interactive media, directorial: you do this = that will happen. I guess this is more in the realm of

games rather than pure play, as in, there must be a result; there is a winner, there must be a loser. But it gets very interesting because in the kind of play we are describing here, there are some very fixed circumstances like when you start thinking about the users, what they will do with it. In your work, one of the things that really interests me is your ability to re-purpose technologies, things that have been developed for one purpose but then bringing them into this arena of play and affect.

Joey: It's definitely true of all of the yarns and threads that I use. One of the things I try to do with my work – and this is almost just to prove that you can do it because in truth there are so many technical considerations that it is probably not the best solution – is to get away as much as possible from wires and hard components, to use conductive yarns and threads and integrate them into textiles with weaving and embroidery and sewing and quilting, etcetera, to create soft circuit boards. I used to call it soft computation but I just came up with a new term a few weeks ago, because a lot of people talk about software but they spell ware W-E-A-R. In fact one of the courses I teach is called **second skins and software** but I didn't come up with that name, I wouldn't necessarily use those terms. I kept thinking soft wear, that's not really the right way to talk about it because it's not really about software ... anyway, I started thinking about it as soft hardware, shardware, or shware. Tee hee. So now I work on **shware**, but a lot of that work is predicated on whether you have the appropriate kind of yarns, spun or continuous twisted sort of things; whether they integrate conductive materials at the fibre level or if it is like a nylon thread that has two stainless steel filament wrapped around it. There are many different materials developed not necessarily for military, but definitely for aerospace, especially the Dupont stuff, which is used for electro-magnetic shielding in outer space. I actually don't fully understand it

Jake: I have to admit I am glad to hear that

Joey: I know bad things happen up there (much laughter)

Jake: Bad things happen here too, they are starting to spec some of these materials for earth home use as well!

Joey: I know. Actually, the Bekintex [ <http://www.bekintex.com/yarns> ] yarns that I use are mostly developed for industry and to create surfaces which protect against EMF (electro magnetic fields) on this planet, but also for factories where they deal with sensitive equipment which incorporate these conductive fibres into carpets and so on. So a lot of those yarns I am now using to weave, sew or embroider, to make touch sensors or capacitive sensors on clothing, are traditionally used for industrial and aerospace, if not military, purposes.

Jake: Well I guess the big military project, or at least the one made most public, was the smart shirt.

Joey: The Georgia tech one.

[ [http://www.gatech.edu/news-room/archive/news\\_releases/sensatex.html](http://www.gatech.edu/news-room/archive/news_releases/sensatex.html) ]

Jake: Yeah and now the ability to camouflage with projection

Joey: the dynamic camouflage.

Well, the original research around the Georgia tech motherboard, was for triage out in the field, in the sense of . discontinuity. The shirt is woven with many optical fibres which are very good sensors for continuity. So a bullet hole is picked up as a discontinuity. If you put light on one end (of the fibre) and it doesn't come out the other, that is a discontinuity right there. According to the stories I've read, the shirt knows where you are wounded and if it is a very large discontinuity, it's triage in the sense it will say: don't bother sending the rescue team, it's too late. They've been trying to market it for almost three years. They have a front, but I'm not sure they have a product and are selling anything as of yet. It is being marketed as a fitness/sports sort of thing, as well as something for children and the elderly which is everybody's favourite user group when it comes to surveillance technologies. Which is like saying the elderly and children don't have the same rights to privacy as we do. That is how they justify a lot of this research, which is of course funded by the military, like having a GPS in everything we own. And a lot of people accept it, even a lot of artists, which just blows me away. Artists working with the tracking of everybody because it is so cool, you can map out the social groups. It's such bullshit you know, and it all just comes from an acceptance that tracking each other is cool because these are the technologies that are given to us, these are the technologies that are being funded Anyway children and the elderly are not considered to have the same rights as us middle aged people.

Jake: Well, we are the purchasing demographic that will be responsible for tracking our youths or elders. Because we have the money to spend on them and are probably determining what moneys they get to spend.

Joey: It is just so interesting that the assumption is that the elderly or those who are sick would want to stay at home longer even of that means surrendering all their privacy, rather than going into a nursing home and it's the same with children. The proliferation of surveillance technologies is all justified by fear, this bizarre culture of

Jake: These technologies are still based on the ideals of a perfect body, and a perfect body being of a certain level of ability and function – excluding that which is perceived as a *flawed* body as just a different thing. It seems much of this technology completely denies difference. Some of this technology seeks to make equal a very utopian notion of what equal would be. The more intriguing work acknowledges difference in a very unusual way and suggests that perhaps we don't have to arrive at the same abilities, but that we all need access to potential information. These tracking technologies are very much part of that. We buy into them because most often they prey on the pretence of caring. Just as the paternal notion of big brother was supposed to be the right thing for the masses, us being able to *watch* our children at all times or know where mom with Alzheimer's is at all times, is supposed to be taken on because this is how we are able to care for these people, but it precludes notions of simple contact. Actually being there.

Joey: I believe that a lot of the assumptions for ubiquitous computing, (ubi-comp research), are similarly problematic and by making your environment “smarter” (in huge quotes) we are taking away a lot of actual presence and forms of communication.

Jake: Such as full body perception, which is not one prescriptive sensor reading one form of data, one individual eye. Things remain quite ocular-centric with that kind of surveillance technology, perceiving the other as an image on screen. Like now, we may primarily be engaged aurally, but so many other factors alter my perception of this experience.

Joey. It's also interesting what you said about the perfect body because I met this research scientist named Gregor Wolbring last year. He was born to a mother that took thalidomide, so his body is very different form what is accepted as the normal, but he is incredibly self sufficient and is a bio chemist at the university of Calgary and an advisor on bio-ethics issues to the Council of Canadians with Disabilities. He shows up at a lot of conferences that Sarah Diamond [<http://www.codezebra.net/>] organises at the Banff Centre [<http://www.banffcentre.ca/bnmi/>] to bring up the notion that we don't all have the same body and we shouldn't all be designing for that body. For example, he doesn't have legs, so he meets a lot of people who want to design him legs

Jake: and he may not desire legs.

Joey: Right Actually, he meets with people that want to make him legs, and first of all he doesn't want legs, he just wants a better wheel chair. So they make conscious design decisions to limit the abilities of the legs, to make them just like me to make sure to give this person legs, but not to make them too fast or too strong, because that's not normal. So even though the scientific possibility is there to make him a super man, they won't do that because of these bizarre ideas and notions of the normal body, or what you called the ideal body, but not too good, because then it would be abnormal.

(...)

Joey: One of the things we teach in our program at Concordia, computation arts, is to work with the tools at the lowest possible level in order to actually create your own tools and be able to create new sorts of content, or environments. And I wonder, as programming environments are becoming more accessible, even through scripting languages and integrated kits are actually fairly simple to use once you've grown up in this culture of technology. These things will become either customisable or modular and a lot more people will be creating their own kinds of devices and this might take things in different directions. Again the danger is in how easily we accept components or modules like GPS tracking or wireless communication how easily we accept the idea that yes it would be wonderful if all objects could communicate with one another wirelessly, even though there really isn't any clear reason for that, and if you look into it deeper it's again very much based on this culture of surveillance but it's so seductive and I don't know why that is.

Jake: As with all new technologies from 1600AD on – I mean, we do tend to think of this as such a contemporary set of circumstances. I've been lately interested in Marconi, for example. He started developing these communication technologies because he didn't feel comfortable around other people. He didn't like to be around other bodies. He preferred to be alone. If he could find a way to mediate his contact, he preferred that. Now that these technologies are being taught in art schools, not tech schools but art schools, it's interesting how the hybridisation of education is allowing the same information to be taught with such different intent. New technologies always hold both a threat and a promise when one describes the notion of the potential for communication and that things could be communicating at all times, this sounds like, “isn't that a remarkable opportunity”, but I always feel I have to ask some old school Marxist questions: who benefits? Who pays? Who's talking? Who is listening? And, does anybody really have that much to say?...

You are teaching at Concordia in the now called Computational Arts program, but you have an unusual academic history. You got your BFA and a Math degree at the same time and then made the decision to pursue the technological or the more logical end of it, which at this point and time could happen in art school.

Joey: Although you know why? MFAs are expensive you know. The Media Lab at MIT [<http://www.media.mit.edu/>] is the only school that I applied to for grad school and the only reason why I chose that one is because if you get accepted you automatically get a full scholarship and living expenses, so I actually had a salary of 1500 USD a month and all my tuition paid for, so I was actually just being cheap!

Jake: The difference between that and art school is pretty remarkable. I mean you could feel safe, this kind of security can allow one to become pretty creative, perhaps become a better scientist and probably a better citizen (artist poverty is so over-rated)

Joey: When I first got there I was working with software, writing my own software for graphics and then started talking with Hiroshi Ishii. When he saw my graphics, he really loved it but he was asking “why are you still using a mouse, you could be using these beautiful, squeezable interfaces”. That's what got me interested in physical media. I was interested in the body and he wasn't, I was interested in soft things, he wasn't, so I ended up leaving and started up a company with Maggie Ort, (IFM), <http://www.ifmachines.com/>. But even that was not quite the best place for me to pursue a lot of ideas that I had. Now being at Concordia, in academia, and able to get considerable research money, I am able to do considerably wacky things.

I have two levels to my research, one is very much the fundamental research in trying to construct these soft electronic textile-based substrates for communication and mostly for displays. I definitely come from this traditionally female, feminine (?) point of view where clothing is about expression, that electronic textiles will

enable this kind of dynamic clothing, interactive clothes, reactive clothes, and that the killer app (to talk in tech terms) is really personal expression and changing identity; that kind of definition of the second skin. () Coming from that point of view, a lot of my research deals not only with these particular substrates but also those that will enable or be used as display surfaces to enter this arena of reactive garments. I also made a decision a while ago, to try to stay away from emissive technology, things that light up like LEDs and so on, because I'm not really that interested in performance. I'm more interested in the kinds of things, fabrics you can wear during the day, so really colour change or shape change. With my research assistants, in particular Christine Keller, we do a lot of work in developing different ways of weaving or embroidering or sewing together these other yarns or threads or fabrics that conduct in different ways and at different levels, to build simple soft circuit boards but also things that can address a display surface. So that's part one of my research



Feathery dresses - photos Vincent Leclerc

Part 2, okay, if you have that then what kinds of applications make sense? What kinds of garments are meaningful or fun or interesting? That is more what I think of as my art practice. These days I'm especially interested in ideas of memory and (to again take a tech term) "history of use". A lot of people talk about history of use and how it first became relevant with the web, like with hit counters. In the physical world things become worn and you see how many people have stepped there and it's dirty. In the digital world that can't really happen, so different methods have come up to indicate history of use on digital objects. Now that we have physical objects that are digitally enhanced, what kind of memories do those objects have and how can you indicate their histories, their physical histories? And with a digital layer on top, how can we manipulate those histories in order to both reveal, hide, augment what you want to say, what you want to reveal, not only about what you are now, but also about your history. The simplest examples of that are dresses that remember how you have been touched, or where you have been touched, and even dresses that have thermographic spots.

For example, a skirt that remembers when it's been groped so it remembers what I call intimacy events. A lot of it is kind of funny conceptual work. Part of it actually aims to reveal what's usually invisible – that is that wearable technology actually can remember personal things and can then display things publicly. Like, when you have a cell phone and you're told that every call can be tracked and is stored in a database and that maybe someone can have access to, that you don't see it visually so you're like, whatever, who cares, but when you see a skirt that displays when you have been groped, suddenly it takes on a whole different meaning. Wait, these technologies can actually remember what I have done and communicate that to other people. So that's part of it, just to visually illustrate those ideas of surveillance and loss of privacy. It's incredible what a difference it makes. If I talk about potentially invasive techniques of biometric sensing like if your doctor has access to that data, your insurance will also have access to it and potentially deny you coverage, and people in the audience are like, well, whatever, just don't get sick. But suddenly I show them this dress and if you squeeze it or grope it, that information can be shown to your lover later on and suddenly everyone starts taking it seriously. It's fascinating, just by having little lights that flash when you have been groped, suddenly people's perception of that (surveillance technologies/history of use) change.



*The Finger Dress* - photos Marcelo Coelho

Another big motivation is this idea of embodied knowledge and this idea of intimacy as an embodied thing. Steve Mann talks about intimacy as well, and one of the examples that he gives is taking his eye-tap device into somebody else and somebody else plugging their eye-tap into him. Being able to see the world through the other person eye-tap device even for just a moment usually they only see themselves really and that is a definition of intimacy. It is very disembodied, very mediated. A lot of wearable and portable technologies enable this greater intimacy, this possibility of communication, but not physical. It enables us to evolve as a society in many different ways. It enables us to keep in touch with people we wouldn't keep in touch with, except there is no touch involved. So a lot of these dresses I'm working on also deal with ideas of technology that change social patterns towards the more physical. For example at Banff this summer, Sarah Diamond organised this fashion show, (inside/outside <http://www.horizonzero.ca/flashsite/issue16/issue16.html?lang=en&section=intro16> ) and we had dancers that performed in different kinds of costumes (from the electronic textiles and wearable computing fields). I had made the "Touch Dress Series". I have the ones I call the feathery dresses, that have LEDs and touch pads, and the ones I call the spotty dresses which have thermographic spots. There are three of each, which was really important, because very often these wearable things are shown as one, shown in a gallery as one thing so you don't really interact with it, you kind of push it and well. If you have two people each wearing one, they kind of touch each other, but you can't really start thinking about social patterns yet, but once you have three you really start seeing a social development. How is it going to work once we have more people wearing these strange things? The feathery dresses have touch sensors, basically just switches made out of metallic organza: one just above the breast, one on the front hip, and one on the back hip, and there were three dancers wearing them and touching each other and touching themselves. They were at first very shy, because they weren't really used to touching each other, but as the day went on they really developed this wonderful choreography of physical intimacy and touch. Same with the spotty dresses where you actually have to rub each other, or rub yourself or lean against each other to make the spots disappear. Very interesting, physical intimacy and touch

So that's how I am trying to bring the body back into wearable technology.

..  
*listen to a radio interview with Joey on the XX-Files :\_*  
[http://dpi.studioxx.org/images/intCKUT\\_joey.mp3](http://dpi.studioxx.org/images/intCKUT_joey.mp3)

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Joanna Berzowska is an Assistant Professor of Design Art and Digital Image/Sound at Concordia University in Montreal. Her work and research deal primarily with "soft computation": electronic textiles, responsive clothing as wearable technology, reactive materials and squishy interfaces. She is the founder of XS design studio in Montreal. She is also founder and senior design advisor of International Fashion Machines in Boston, where she developed the first electronic ink wearable animated display and Electric Plaid, an addressable colour-change textile. She received her Masters of Science from MIT for her work titled Computational Expressionism. She worked with the Tangible Media Group of the MIT Media Lab on research projects such as the Music Bottles. She directed Interface Design at the Institute for Interactive Media at the University of Technology in Sydney. She holds a BA in Pure Mathematics and a BFA in Design Arts. Her art and design work has been shown in the Cooper-Hewitt Design Museum in NYC, SIGGRAPH, Art Directors Club in NYC, Australian Museum in Sydney, NTT ICC in Tokyo and Ars Electronica Center in Linz, among others. She has lectured on the intersections of art, design, technology and computation at SIGGRAPH, Banff New Media Institute in Canada and Interaction Design Institute Ivrea in Italy, among others.  
<http://www.berzowska.com>

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Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York; Routledge, 1991), pp.149-181. Respectively p153, 180 and 164.

#### **A Glossary of Terms:**

Taken from email interview of Joey by Nina Czegledy: ISEA Newsletter

THE INTER-SOCIETY FOR THE ELECTRONIC ARTS

ISEA NEWSLETTER #96

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#### **Definitions: Joey Berzowska**

**Tangible Media** is a term coined by Hiroshi Ishii of the MIT Media Lab to describe tangible user interfaces which employ physical objects, surfaces, and spaces as tangible embodiments of digital information. These include foreground interactions with graspable objects and augmented surfaces, exploiting the human senses of touch and kinesthesia. They also include the idea of background information displays that use "ambient media" (light, sound, airflow, and water movement) to communicate digitally mediated information at the periphery of human awareness.

**Smart Materials** (such as "smart fabrics") can be thought of as materials that replace machines and have the potential to simplify engineering considerably. They integrate the functionality of various separate parts into a single material. This is mechanically efficient because it eliminates the need for parts to be physically interconnected.

**Electronic textile** (sometimes called "smart fabrics" or "wearables") refers to a textile substrate that integrates capabilities for sensing (biometric or environmental), wireless communication, power transmission and interconnection technology, to allow sensors or things such as information processing devices to be networked together within a fabric. The substrate for an electronic textile (the textile "circuit board") is often constructed from various conductive yarns instead of wires.

**Soft Computing** is a term that I use to describe the use of conductive yarns and fabrics, active materials and flexible sensors to allow the construction of electronic circuits on soft substrates. It implies a move away from traditional electronics and the exploration of emergent materials that can enable physical computation for the body and personal spaces.

I also include this definition from Roz Picard's research group.

**Affective Computing** is computing that relates to, arises from, or deliberately influences emotions  
<http://affect.media.mit.edu/>

Our research is aimed at giving machines the skills of emotional intelligence, including the ability to recognize, model, and understand human emotion, to appropriately communicate emotion, and to respond to it effectively. We are also interested in developing technologies to assist in the development of human emotional intelligence.

Our approach, grounded in findings from cognitive science, psychology, neuroscience, medicine, psychophysiology, sociology, and ethics, is to develop engineering tools for measuring, modeling, reasoning, and responding to affect. Thus, we are developing new sensors, algorithms, systems, and theories that enable new forms of machine intelligence as well as new forms of human understanding.

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