



Social Fabrics: Wearable + Media + Interconnectivity

Susan Elizabeth Ryan

Today we know that art can be many things and cannot be pinned down by medium, format or even context anymore. Yet despite the phenomenological freedom art has enjoyed in recent years, when *worn on the body*, art has often struggled for recognition, even given the frequent references to garments and fashion in contemporary art. In fact, artworks that are wearable abound and contribute to an unknown history of projects that people do not necessarily link together or think of as part of a cohesive practice, even though there are many similarities between garments and art as normatively considered. For example, they have similar commercial infrastructures, and garments (or fashion) and art are highly intertwined in cultural literature. Wearables artists use the living body as their vehicle and the social environment as their frame. For decades they have pushed their work well beyond fashion and commerce. And yet the significance of wearable art is often overlooked.

Arguably, it is with the rise of wearable technology—mobile media—that artists working with wearables have begun to achieve critical mass. This is so despite many encumbrances—for one, artists using “wearable media” navigate a difficult path for their work, between commercial fashion, theatrical costume or craft project on the one hand and engineering device or commercial prototype on the other. There are, however, some strong unifying ideas: The work is worn on the body, it exists in the complex multidimensional realities of contemporary social discourse (often simultaneously on-line and off) and it engages with a world transformed by varieties

of “media.” Additionally, and most importantly, the work is deployed critically in terms of viewer interaction and experience.

The creative synergy of wearable technology art (WTA) is also fueled by the exponential rate of development in mobile-media technologies and industries and, in the academy, the corresponding rise of social theory concerning mobile networks, virtual societies and Web 2.0 phenomena. As media become a more intuitive part of our experience as humans and the technologies themselves vanish into furniture and fabrics—as reality merges with the bubble of virtuality (Microsoft’s Surface Technology, for example)—WTA will continue to do the opposite: make connections with the palpable, the fantastic, the self-consciously mechanistic and the intractably organic aspects of the body as dynamic interface.

Social Fabrics: Wearable + Media + Interconnectivity was a time-based exhibition presented as a modified runway show of artworks utilizing wearable media and technology (Fig. 1). The venue was a ballroom at the Adams Mark Hotel in downtown Dallas, Texas, and the show was sponsored by the Leonardo Education Forum and held at the Annual Meeting of the College Art Association on 22 February 2008. Co-sponsoring the event were the University of Texas at Dallas and the College of Art and Design and Lab for Creative Arts and Technologies, both at Louisiana State University. The exhibition was curated by my colleague Patrick Lichty and myself.

All the works shown in the exhibition are wearable. More than this, however, they enlarge the conceptual potential of wearable media in specific ways. The exhibition was intended to demonstrate convergences between individual expression and statement-making on the one hand and the nature of “network society” on the other. Technological garments and accessories with social capabilities were presented alongside works that, while not employing technology outright, comment on or critique the implications of our digital media-infused and fashion-driven lifestyles. Most of the participating works are garments, but at the same time, the pieces integrate multiple systems of technology and discourse. Some of the pieces are mini-performances or events that interacted in various ways with the audience at the exhibition.

The Leonardo Gallery that follows here and in the expanded version on Leonardo On-Line (see Article Frontispiece) represents the works in the Social Fabrics exhibition together with artists’ statements concerning their intentions and working methods [1]. These works enable social communication on

ABSTRACT

Art as a garment, fused with sensing, media and network technology, can become a powerful means for investigating current forms of social interaction and the place of the body and self in digital society. The Leonardo Social Fabrics Gallery presents new works exploring this rich mix of old and new arts and technologies.

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Article Frontispiece. See Leonardo On-Line <www.leonardo.info> for an expanded version of the Social Fabrics Gallery. Included in the on-line gallery (from top left): (a) Kristen Nyce, *Conversation Loom*, balsa wood, 2007. (© Kristen Nyce. Photo © Rod Parker.) (b) Cat Mazza, *Logoknit Sweater*, yarn and knitPro freeware, 2008. (© Cat Mazza. Photo © Rod Parker.) (c) Heidi Kumao, *Monitor II: Audio-Activated Dress*, 500 LEDs, microphones, custom electronics, purse, batteries, 2005. (© Heidi Kumao. Photo © Rachelle Beaudoin.) (d) Kathy Bruce, James Cook and Alastair Noble, *Digital Mallarmé: Virtual Techno-Poetry in Motion*, LCD displays, video monitor with sound, 2008. (© Kathy Bruce, James Cook and Alastair Noble. Photo © Rod Parker.) (e) Anke Loh, with Alan Sahakian, Jonathan Bender and Linda Buzzi, *Wearable Patterns*, Luminex fabric, LEDs, sensors, circuits, 2007–2008. (© Anke Loh. Photo: Leonardo Kaplan.) (f) Heidi Kumao, *Posture Generator* (backstage), custom corset, speakers, custom electronics, 9-volt battery, 2005. (© Heidi Kumao. Photo © Rod Parker.) (g) Hoyun Son, *unspoken_dallas_caa*, site-responsive public performance with 3 LED vests and stenciling, 2005–present. (© Hoyun Son. Photo © Rod Parker.) (h) Teresa Almeida, *Modes for Urban Moods: Space Dress*, ripstop nylon, micro fans, switch, circuit board, 2005. (© Teresa Almeida. Photo © Santanu Majumdar.) (i) Christopher D. Wille, *With God on Our Side*, powder-coated aluminum, colored Plexiglas, electronic components, military issue Kevlar helmet, 2005. (© Christopher D. Wille. Photo © Rod Parker.) (j) Rachelle Beaudoin and Jeanne Jo, *Ear Buddies*, modified headphones, 2007. (© Rachelle Beaudoin and Jeanne Jo. Photo © Rod Parker.)



Fig. 1. Social Fabrics: Art + Media + Interconnectivity, view of runway, Adams Mark Hotel, Dallas, Texas, during the 2008 College Art Association Annual Meeting. (Photo © Santanu Majumdar)

distinguishable—but multiple and overlapping—levels. Some encourage the formation of social groupings in their vicinity: examples are Kristen Nyce’s *Conversation Loom*, Rachelle Beaudoin and Jeanne Jo’s *BFFM* and *Ear Buddies*, and Daniela Kostova and Olivia Robinson’s *Negotiations*. Other works—such as Ebru Kurbak, Ricardo Nascimento and Fabiana Shizue’s *Taiknam Hat* and Anke Loh’s *Wearable Patterns*—communicate with others by visualizing data. They index wearers’ bodily functions or environmental factors and make these visible

to others. A third group of pieces in the exhibition perform social critique: These include Teresa Almeida’s *Space Dress* and Cat Mazza’s knitPro *Logoknits*. Still others (XS Labs’s *Skorpions* and Kathy Bruce, James Cook and Alastair Noble’s *Digital Mallarmé*) communicate through metaphor and formal inventiveness. Most works combine discursive techniques, however. For example, Matt Kenyon and Doug Easterly’s *IED*, which appears to be a masculine, almost military accessory, accesses, culls through, and displays U.S. military casualty data for everyone in the

vicinity to see, as an ongoing critique of war. Sarah Kettley and Frank Greig’s *Speckled Jewelry* are pieces that sense human proximity so that potential social encounters become intentional choices.

In all, Social Fabrics demonstrates the intuitiveness and hybridity of wearable technology as a reassertion of the body in the digital world.

Note

1. Materials for the Gallery were prepared by Susan Elizabeth Ryan along with Phil Winfield, Jill Thomas and Jeane Cooper.



Sarah Kettley and Frank Greig, *Speckled Jewelry*, Perspex, Formica, silver, polymer clays and custom electronics (ProSpeckz II prototypical wireless transceiver nodes, LEDs), 2005–2006. (© Sarah Kettley and Frank Greig. Photo © Santanu Majumdar.)

SPECKLED JEWELRY

Speckled Jewelry comprises five neckpieces wirelessly networked for a friendship group. Built at a workbench and deliberately merging traditional craft techniques with emerging technology, each piece incorporates a prototype wireless sensor node or “Speck,” which acts to locate and identify other specks within a range of approximately 20m radius. This information is then visualized on five dedicated LEDs, which flash at different rates to reflect three social distances. These are distances at which ways of greeting have been observed to change: intimate (under 30cm), social (30cm to 1m), and distant (over 1m through a limit of 20m). These distances accord with Edward T. Hall’s observations and identification of proxemics (in *The Hidden Dimension*, 1966). When wearers of *Speckled Jewelry* observe the flashing, they can choose whether to act on this information or not. The jewelry is the first successful application of Speckled Computing, developed by a research consortium of five universities in Scotland, and related to the Smart Dust project <www.specknet.org>.

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Joanna Berzowska and Di Mainstone, XS Labs, Montreal, with Marguerite Bromley, Marcelo Coelho, David Gauthier, Francis Raymond and Valerie Boxer: (a) *Skorpions: Skwrath*, leather, silk, SMA, custom electronics, 2007. (© Joanna Berzowska. Photo © Rod Parker.); (b) *Skorpions: Luttergill*, leather, silk, SMA, custom electronics, 2007. (© Joanna Berzowska)

SKORPIONS: SKWRATH AND LUTTERGILL

Skorpions are electronic garments that move and change in slow, organic motions, controlled by internal programming. They integrate electronic fabrics, the shape-memory alloy (SMA) Nitinol, mechanical actuators such as magnets, soft electronic circuits and traditional techniques such as sculptural folds and drapes of fabric across the body.

Skwrath, part of this series, is a quilted leather bodice lined with blood-red silk. Its sculptural, wing-like collar can be used to conceal the host's face or can be torn open. The abdomen is made up of three interlocking leather segments, embroidered with threads of SMA activated through a custom electronic board. When people come too close, *Skwrath's* plates retract, and the red silk, suggesting blood gushing forth, is displayed.

Luttergill is a soft, quilted cotton cocoon that mirrors the female form. Several seams roll open and, with the aid of SMA, are controlled through custom electronics. *Luttergill* appears to come apart slowly at the seams, revealing serene blue silk inside.

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STIR IT ON!

Stir It On! is an interactive skirt that reacts to any close encounter on its surface. In crowded cities like Seoul, Korea, where I live, many people bump into you every day. Design patterns in the skirt emit subtle lights when they are “stirred” by objects or persons passing by. The piece was inspired by bioluminescent dinoflagellates, which glow when they are agitated. Depending on the wearer’s disposition, the interactive reaction of the *Stir It On!* skirt can express either an alarm that says “stay away” or a playful request to come closer.

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Younghui Kim, *Stir It On!*, QProx 113 Touch Sensor, conductive thread and fabric, LEDs, Arduino board, 2007–2008. (© Younghui Kim)

TAIKNAM HAT

Taiknam Hat is animated in accordance with the changes in surrounding radio frequencies. Our intention is to materialize the invisible and contribute to our awareness of the increasing level of electromagnetic radiation in our environment. The electromagnetic waves that radiate from physical devices create an invisible landscape that interacts with physical space and its inhabitants. This landscape is transformed into a new form of pollution, electrosmog, which has biological effects on humans and animals. *Taiknam Hat* attempts to materialize the electrosmog by emulating horripilation, the erection of hairs or feathers in various species under irritation and stress. In some animals, especially birds, horripilation is also attached to another instinct, that of “self-display/signaling.” *Taiknam Hat* utilizes horripilation as a metaphor to express our bodies’ conflict with electromagnetic radiation. The headwear employs actual movable feathers that become activated and move according to the amount of radio frequencies in the surroundings.

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Ebru Kurbak, Ricardo Nascimento and Fabiana Shizue, *Taiknam Hat*, 2007, feathers, fabric, detection/motion-driving system, radio frequency detector, microcontroller, motor. (© Ebru Kurbak. Photo © Rod Parker. Inset photo © Alastair Noble.)



Matthew Kenyon and Doug Easterly (S.W.A.M.P. Projects), *Improvised Empathetic Device (I.E.D.)*, custom software and hardware, 2005–present. (© Matt Kenyon. Photo © Jeremiah Ariaz. Inset photo © Matt Kenyon.)

IMPROVISED EMPATHETIC DEVICE (I.E.D.)

The purpose of the *I.E.D.* (Improvised Empathetic Device) project is to give real presence to the death and violence occurring in the Middle East. *I.E.D.* is a wearable computing device that is connected wirelessly to a server running custom data-mining software. Hardware consists of a custom circuit board modeled after a map of Iraq and powered by a nickel cadmium battery, a modified alphanumeric text pager and a solenoid linear actuator. A custom software application continuously monitors the Web for reports and personal details of slain U.S. soldiers in real time. When new deaths are detected the data is extracted and sent wirelessly to the *I.E.D.* armband. The LCD readout displays each soldier's name, rank and the cause and location of death and then triggers an electric solenoid to drive a needle into the wearer's arm, drawing blood and immediate attention to the reality that someone has just died in a war that is raging far away. A non-wearable companion piece to *I.E.D.*, *Notepad*, deals with Iraqi civilian casualties.

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Daniela Kostova and Olivia Robinson with Galina Kumanova and Kelly Bogan, *Negotiations*, custom software, wireless monitor and transmitters, wireless surveillance camera, video camera, webcam, laptop computer, chroma key fabric, foam, 2006–2007. (© Daniela Kostova and Olivia Robinson. Photo © Rod Parker.)

NEGOTIATIONS

Negotiations explores cross-cultural communication and interpretation via an interactive system that utilizes blue-screen video techniques as a tool for manipulating human bodies moving through unknown environments. As both a conspicuous costume and a virtual act of assimilation, each performance fosters the development of a site-specific story. Recurring themes include: estrangement and integration; the cultural economics of “authority”; the territoriality of ownership and the mediation of experience. The *Negotiations* system uses computer and surveillance technology to create the real-time video. The two characters, the Alien (left) and the Authority (right), each have a video camera linked to a computer embedded in the Authority’s costume. Custom software composites together the two video streams to create a “negotiated” final video. That final video becomes the focal point, allowing relationships to form and highlighting the double consciousness of cross-cultural communication.

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Anne-Marie Skriver Hansen, *Vacuole Robes*, white elastic stretch band pipes with zippers, 2 Bluetooth Create USB interfaces, 2 accelerometers, 10 linear spring-loaded potentiometers, 2007. (© Anne-Marie Skriver Hansen. Photo © Santanu Majumdar.)

VACUOLE ROBES

Using physical interface experiments, I investigate the area between people's physical and social needs and boundaries. The intent is to give the viewer-participant a physico-aesthetic experience that may change her/his kinesthetic perception and physical interaction with other people. The *Vacuole Robe* interface is an attempt to provide a feeling of oneness. When two people interact through the sound medium of the *Vacuole Robes*, they create a soundscape to which both can contribute on a continuous basis. Each participant cannot see, but can only hear, the combined result of their common movements. Participants are separated from each other by cocoon-like robes that exhibit their bodily shapes and movements. By separating participants from the awareness of their looks while they interact with the work, I try to create an ambivalent feeling of being exhibited—and at the same time safely enclosed and hidden—in the piece itself. The *Vacuole Robes* invoke forms of communication that have become superfluous in a time when the spoken and written word dominates.

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BFFM

BFFM allows wearers to send and receive audio files to and from their peers without any legal repercussions. A necklace acts as an FM radio transmitter, transmitting sound for the radius of a few city blocks. Four other necklaces are radio receivers, complete with built-in speakers. A message from the transmitting necklace is broadcast to the receiving friends and those around them, creating a system of temporal file sharing. Like the boom boxes of the 1980s, the necklace is an attention-getting device and can play audio in public places. Like a friendship bracelet, the necklace is a wearable visual indication of intimacy. However, it also provides an audio connection from friend to friend.

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Rachelle Beaudoin, Jeanne Jo and Islay Taylor, *BFFM*, necklaces with FM radio transmitter, FM receivers, speakers, conductive thread, 2007. (© Rachelle Beaudoin, Jeanne Jo and Islay Taylor. Photo © Santanu Majumdar.)

POSTAL GOWNS BY FREEWEAR

Freewear is an ongoing project that explores the possibilities of creating garments out of free materials provided by other city dwellers. The *Postal Gown*, the first product of Freewear, was made using USPS Tyvek envelopes. All the notions needed to sew the dress were obtained via a gift-economy network called Freecycle. The *Postal Gown* is a revival of the Paper Dress of the 1960s, which was extremely popular because it only cost one dollar and was disposable. The *Postal Gown* does not have to be thrown away after use and is completely free, encouraging users to refuse to pay for materials and to reuse stuff that otherwise will turn into waste. Along with the exchange of goods, Freecycle also entails an exchange of stories: You are open to encounters, with strangers and with the city itself, that might otherwise have been foreclosed by dominant modes of exchange and consumption. Hacking the post office to get the main resource enables users to divert the infrastructure to their own purposes.

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Geraldine Juárez, *Postal Gowns by Freewear*, U.S. Postal Service envelopes, Freecycled notions, machine sewn seaming, 2007. (© Geraldine Juárez. Photo © Santanu Majumdar.)