

# 2029

## Fashion Futurism

By Patricia Flanagan

**Futuristic fashions depict the ideologies** of the period in history when the fashions were created far more accurately than they manage to predict future fabrication materials or functions. For example, the birth control belts in Aldous Huxley's 1930 dystopian vision *Brave New World* are shown in the 1980 film version as clear plastic "Malthusian belts worn around the hips supporting white *computoseption* dials" resembling the dials of analog desk telephones of the 1980s. The belts are worn over Spandex unitards. The materials used represent the technology of the time of the film's creation even though the film is set in 2540, and the imagined function of the depicted technology grapples with the contraception debate of the time as much as it anticipates a future condition.

Let's look beyond the traditional perspectives of fashion and consider *wearables* as an interface between the body and the world living in the fuzzy border between private, intimate, personal space and the public realm. In *Everyware: The Dawning Age of Ubiquitous Computing*, Adam Greenfield proposed that software is evolving into every environmental object. One aspect of this change is the infusion of technology into the fabrics of our clothing that might be referred to as "everywear". Hussein Chayalan's use of memory wire, for example, elevates the skirt of a dress to disappear under a tailored jacket. This alteration could be in reaction to environmental changes in temperature or the wearers desire to change style from day to evening wear.

Simultaneously, the line is blurring between the real and the artificial body. From cosmetic surgery and implanted technologies such as pacemakers, to tapping into the blood stream to charge body batteries and the use of conductive tattoos, biotechnology is mashing-up the chemistry and biology of the body with new intelligent materials. In Western Australia, Oron Catt's Biowear experiments successfully produced test tube-grown tissue. This technique might solve ethical issues in the fashion industry, for instance, culturing skins that he calls "victimless leather." Increased mobility and cultural cross-fertilization mean artists and designers are becoming interdisciplinary practitioners who work across multiple fields. In fashion, designers are collaborating with computer scientists, psychologists, biologists, sociologists,

anthropologists, and industrial designers.

Two key concepts to understand the future are *fungibility* (that is, exchangeability) and empathy. Fungibility is central to money: everything can be classified in terms of exchange value and traded without regard to its physical form. A more recent, powerful

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form that appeared in the 1950s is binary computer code. Now all phenomena lose their "bodily form" and live as numerical codes that can be materialized in different ways. The data used to produce an image can be exchanged to present sounds, for example. Neil Harbisson has achromatopsia, meaning he cannot see colors; he has been wearing a small computer to enable him to hear colors since 2004. Harbisson reported that adaptation time was required to memorize sounds associated with colors, but quickly the association felt natural. Then, he expanded the spectrum to include

colors invisible to the human eye, such as infrared and ultraviolet. The color combinations of clothing may be chosen by selecting musical scores. Harbisson now dresses to sound good rather than look good. He wore "C major" to present a lecture for the TED conference in 2012. By inverting the role of sensors and actuators, a dress may change color in response to sounds in the environment.

Clothing becomes a means for expressing data. This capability is just one potential future in which fashion, beyond aesthetic design, will engage with the flow of information and integrate seamlessly with the physical world, blurring the boundaries between body, clothing, and the physical environment.

This is my fashion forecast for 2029, the date when some predict, following Moore's Law, computing capacity will be equal that of the human mind. Ray Kurzweil, applying Moore's Law to neuroscience, predicts we shall understand the complexity of the mind at the same time as we reach its processing capacity. This future moment is known as the Singularity. The precedents of Singularity began with early experiments in electrode-stimulus mind control by José Delgado, who implanted electrodes into a bull's head to control its behavior. For his death-

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defying experiment, Delgado, armed with a radio control device, was able to calm a charging bull.

Mapping the human mind's electronic signals produces bio-data that can be used to send signals directly to intelligent clothing, which in turn can respond. The details of fashion's future are currently fuzzy. What seems clear is that keyboard/screen-mediated human-computer interaction will be a thing of the past. Communication through brainwaves or other somatic sources will be able to create changes, movements, colors, and sounds in our fully-fashioned future.

Think of Mathew Barney's crystal prosthetic legs in his art house film *Cremaster Cycle* or Alexander McQueen's intricately hand-carved ash wood prosthetic legs for paralympian Amiee Mullins, and add technology. The user experience of computer-mediated objects can now be directed by thought alone, not action. Miguel Nicolelis' experiments first showed this potential by recording monkey brain waves. By replaying them, he found he could control a robotic arm. Surprisingly, after the monkey mastered controlling the robotic arm through its movements, the monkey eventually learned it could control the arm by the thought of the movement alone. Wearables such as neuroprosthetic limbs for assisting the disabled, and extending the potential of the abled, are becoming a reality.

All of these experiments have implications for user interfaces. Humanistic Intelligence is a term promulgated by Steve Mann, who pioneered wearable computers. He describes a framework in which wearable computers become integral to a harmonious interaction between our human body/mind.

As we approach the Singularity, empathy becomes a primary distinguishing factor between comprehending the world through a data stream versus a physical, tactile experience. Empathy seems less ephemeral than we previously understood it to be; seemingly a pure emotional response can now be understood as chemical phenomena. Recent research indicates human beings are ethical by nature. We are homo-empathic as a biological trait to ensure our survival. In 1990, a group of neuroscientists discovered mirror neurons in the premotor cortex through which the motor activity of the brain can mirror the action of others. This means that when we witness something happening to another, our bodies mirror the emotion. These brain circuits can keep us from estranging ourselves from others. Indeed we do physically feel another's pain.

Blurring the line between the physical and digital body, Hussein Chalayan, in collaboration with Nick Knight, presented his 2008 fashion collection to an admiring public audience in virtual catwalk shows. Three-dimensional body scanners enable fashion designers to work on their collections virtually and customers to visualize their wardrobe selections on their body before the garments are physically manufactured. These

technologies are profoundly changing the fashion industry.

These mediated fashions are indicative of what Guy Debord called "the society of the spectacle," in which authentic experience is replaced with its representation. Debord was a member of the French "Situationists" whose ideas about art and design attempted to engage with the moment. Like the Italian "Futurists," they embraced motion, movement, and dynamism, and identified fashion as a prophetic social phenomenon, promulgating their vision of future society. The Futurists were from different art and design disciplines, but they shared a vision. Vincenzo Fani, known as Volt, produced

Kong, where, over ten days, a group of professionals and creative thinkers from many backgrounds and cultures came together to explore the interactions of art, science, and technology under the theme Haptic InterFace.

Imagine a second skin interface that tangibly communicates through touch. The touch-sensitive kinetic dress reacts, releasing a nest of "butterflies" to flutter around the wearer's neck. "Nitinol" shape memory wire opens the collar and enables feather-weight PVC butterflies to emerge. When the memory wire cools it relaxes, causing the collar to close again, enveloping the butterflies.

A set of wicker hats, reminiscent in shape to elongated Victorian bonnets, take the

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fashion with fantastic titles in homage to mechanical modernity and speed, titles such as "machine gun woman" or "the antenna-radio-telegraph creature."

The challenge of fashion is that it celebrates the new through perpetual change. Originality is proof of progress: to be fashionable is to be desirable; yet, at the same time, fashion seeks consensus or legitimization to be accepted. It is this paradox that keeps fashion in motion. Futurism is about looking forward, be it Volt, Madeleine Vionnet, Issey Miyake, or Rei Kawakubo. Creative fashion-designers are not only creating clothing but conceiving new modes of living in the world.

Imagine shoes that enable you to have a physical awareness of another person walking. Sensors on the bottom of the shoes communicate via microcontrollers through smart phones to actuators on the top of another pair of shoes. When one person sits to rest, the other will feel the weight lift. When one runs, the other will feel increased pressure and faster rhythm. People wearing the prototype shoes and strangely sensing each other's activities are currently walking around Trier, Germany, and Brisbane, Australia.

This prototype is one result of research carried out in the Wearables Lab in Hong

sound waves from the voice of the wearer and amplify them into kinetic energy in the other's bonnet. One person experiences the voice of the other visually, through the movement of the brim above her eyes, and sonically through the chattering noise that the movement creates in the bamboo reeds from which the hat is constructed. The hat vibrates, causing the brim sticks to chatter. In this way, the voice is transformed into a kind of whisper. Each hat responds to the other, engaging the wearers in an immersive, interactive, haptic, audio-visual experience.

Another example: a wearable pillow that surrounds the head alerts the wearer if he/she begins to snore. Based on a skivvy design around the neck which holds the sensors in place, an Arduino single-board microcontroller and vibrator are embedded inside a padded sculpted hood, shaped like an egg laid on its side. The fully felted headpiece has the appearance of a surrealist sculpture, and the white felt fabric metaphorically evokes a cloud, an apt reference for dreaming and sleep.

Still another example: by wearing specially designed white cuffs with ostrich feather plumage highlighted by a diffused pulsating red light, two people can sense each other's presence even when they are



Figure 1. “Blinklifier” designed by Tricia Flanagan (artist/designer) and Katia Vega (technology design).

out of visible range. The prototype cuffs read the pulse of one person and send it as vibration to another cuff. The production of many cuffs and their testing with larger groups will enable interesting exploration of “swarm behavior.”

“Blinklifier” (see Figure 1) is a wearable computer that amplifies voluntary and involuntary eyelid movement and powers a visible light array that uses bio-data directly to interact with the computer. Although the headdress can be consciously controlled, this fashion artifact is designed to avoid conscious

interaction and instead directly amplify the body’s expression. Blinklifier doesn’t look like a computer; its electronic components are nearly invisible. Attached to metalized fake eyelashes are lines of skin conductive ink. An Arduino microcontroller translates the eyelashes’ blinking movements into signals to light up the LEDs embedded in the large headdress. Facial expressions are complex but easily recognized and naturally understood. By their amplification through worn devices, something usually overlooked in everyday life can become a rich source of

communication, or open potential for new ways of communicating our emotions and understanding others.

As in the space age-inspired futurism of Pierre Cardin’s 1960’s catwalk shows, fashion can create an image of the future. These dreams pave the way for technologies and societies of the future. For user interfaces to become genuinely intelligent interactive systems, we must enable the development of interactive systems that can recognize unpredictable state changes, such as emotion, intension, desire, and empathy. User interfaces of the future will acknowledge the relationship between people, places, and things as emergent spaces that generate meaning through everyday activity. Therefore, user interfaces become ones in which users themselves act as co-designers.

As we develop more intelligent technologies, what is revealed is how little we understand of the complexity that makes up our own human form. By adopting an approach in which objects mediate human beings and human beings mediate objects, we can acknowledge an alternative to the predominant separation of human beings and things. The challenge is to fashion a future that is not based on predicting utopian visions but one that is responsive to changing conditions and acknowledges both mind and body.

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### About the Author



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