LEONARDO GALLERY

Coded Cloth: A 21st-Century Revolution in Art, Fashion and Design

From the exhibition produced by Australian Network for Art and Technology (ANAT)

The Analytical Engine weaves algebraic patterns just as the Jacquard loom weaves flowers and leaves.

—Ada Lovelace

A single connecting thread winds through 300 years of textile and computing history. John Kay's invention of the flying shuttle and Joseph Marie Jacquard's binary punch cards and loom head led to mathematicians Ada Lovelace and Charles Babbage's design and programming for an Analytical Engine, the direct predecessor of our modern-day mechanical computer. Without the warp and weft of textile technology, the hardware and software that enable today's ubiquitous information-processing revolution would never have emerged.

In the early 21st century, the newest hybrid art forms of embedded computing and wearable technology are generating creations that would, until only recently, be beyond imagination. Take for example the luscious wearable artworks of London-based Turkish Cypriot fashion designer Hussein Chalayan—including a short animation projected through 15,600 LEDs and Swarovski crystals integrated into one dress. Chalayan, like many creatives today, works seamlessly across art, fashion and design, appearing to be equally at home showing at the Venice Biennale or Paris Fashion Week.

This blurring of delineated arenas of practice, and the entwining of the latest technologies into established realms, is not new. In 1956, Japanese avant-garde artist Atsuko Tanaka updated the rich textures and intricacies of the traditional kimono with the dazzling colored lights of the modern world. Her *Electric Dress* was composed entirely of light bulbs of all shapes, sizes and intense colors and a plethora of connected electrical cords. It was however a little dangerous as daily attire, appearing mostly as a sculptural form and recently being one of the central works exhibited at Documenta XII.

In summer 2007, in order to facilitate such interdisciplinary experimentation in Australia, Australian Network for Art and Technology (ANAT) initiated the reSkin Wearable Technology Lab in collaboration with Craft Australia and the Australian National University School of Art. Twenty-one media and sound artists; programmers; jewelers; and object, textile and fashion designers immersed themselves into an intensive three-week research and development environment with six facilitators [1].

One of the many outcomes of reSkin was a physical exhibition titled Coded Cloth, held at the Samstag Museum of Art, University of South Australia, in Adelaide (29 October–19 December 2008). The exhibition drew from artists and designers who attended reSkin along with practitioners whose work combined age-old craftsmanship with innovation. In this Leonardo Gallery, we see a sample of that exhibition [2], wherein artists used traditional textile practices such as weaving, stitching, embroidery, printing and dyeing. However, the different electro-mechanical or biological properties of their materials produce aesthetically charming and complex works that have both practical properties and surprising functionality.

Elliat Rich's elegantly designed reactive furniture piece, the *Yala Sofa,* blossoms in the company of others. Working in Alice Springs, Rich employs the motif of the sustaining bush food of the Pintupi people from the Australian Central Desert, the Bush Potato or Yala, to illustrate the importance of connection and community. The Yala flowers printed on the sofa's fabric use a thermochromatic ink and thus remain invisible until the heat from the bodies of those sitting on the sofa "activates" the ink and the flowers appear—just as the Yala plant blooms after life-giving desert rains.

The gathering of food and weaving of cloth—traditional women's business in many cultures—also provide opportunities to fashion close-knit social groups, and it is not surprising that most of the pioneering and prominent figures in the field of wearable technologies today are women. Rich beautifully illustrates her philosophy of designing sustainable "objects that celebrate the poetry of humble pleasures." She understands that sitting together and sharing a cup of tea and a conversation is the invaluable emotional nourishment that grows and sustains our relationships, our community and our culture.

Aotearoan artist Gina Matchitt incorporates the traditional Māori art form of *Tukutuku* patterning (cross-stitch weaving) used for wall panels within the *Wharenui* (meeting house). Her evocative 1.8-meter *Tukutuku* wall panels are constructed with recycled black and grey computer keys instead of dried stalks of *Kākaho,* the creamy-gold flower stalks of *Toetoe* grass, and *Kākaka,* long straight fern stalks, or wooden laths of *Rimu* or *Tōtara.* Here Matchitt explores the theme of much of her work—"to challenge her own boundaries about what is acceptable or not within the sphere of communicating her Maori concepts to a wider audience" [3].

Embedded puzzle-like in the visual patterning of Matchitt's panels are *Whakatauki* (Maori proverbs). When deciphered they provide narratives and lessons on how Maori customary knowledge was distributed and exchanged. They can be read as Wikipedia entries, illustrating how contemporary communications echo those of another time and era.

Encoding the cloth itself, Alyce Santoro weaves fabric from recycled audiocassette tape. Her *Sonic Fabric* was inspired by two things: the "tell-tales" she saw as a child: tiny wind indicators used on sailboats that are often made from small strands of cassette tape—and from which she imagined she could hear music playing; and fluttering Tibetan prayer flags—squares of fabric silkscreened with mantras and hung outdoors, where their blessings can be activated by the wind. Alyce combined these two very different cultural concepts to "create a fabric with sounds I considered sacred woven into it."

Santoro's 5-meter *Sonic Sails* gallery installation is a "ship" that sails on a swell of sound. As the cassette tape retains its magnetic quality through the weaving process, her sonic fabric actually emits sound when a cassette tape head (the piece inside a Walkman that touches the tape) is run across it. In addition to creating sculptural objects and desirable designer goods like handbags and ties, she has sewn the fabric into funky frocks that musicians can "play" onstage, mixing the sounds live to create a totally unique experience.

In what may seem like a science-fiction scenario, bio-artist Donna Franklin has created a living garment—a dress that grows! This dynamic cloth is created from the prolific, non-infectious, non-hazardous Western Australian orange bracket fungi. Her *Fibre Reactive* dress is a mortal entity—its living surface gradually thickens from soft white into an orange skin, with the development of a fruiting body signaling maturity. The dress as shown in these Gallery photos was three months old; eventually it will start to die at around five years of age.

According to Franklin, "the experience of wearing the living garment feels uncanny. . . . Its soft suede-like texture feels like an extension of your own skin . . . a primordial link to the origin of clothes, when our ancestors first wore the skins of other animals." The glowing and seemingly floating hybrid *Fibre Reactive* dress challenges us to consider how we as a society commodify and manipulate other living entities and how that will manifest itself in the not-too-distant future as the physical and cultural impact of biotechnology unfolds.

Exquisite tailoring hides a high-tech secret in an elegant dress jacket by Newcastle fashion designers High Tea with Mrs Woo (sisters Rowena, Juliana and Angela Foong). The stylishly feminine contemporary traveler can be free from unnecessary layers of thick coats and scarves, as her skin is warmed by heating circuits embedded within her elegant *Hidden* jacket pockets.

High Tea with Mrs Woo describe their travel wear for the 21st-century woman as "fashion with secret powers . . . prepared and invincible." Quite often when electronic functions are integrated into fashion for the commercial world, the aesthetic is more masculine, androgynous and/or sporty. This piece highlights a feminine touch—allowing a woman's needs and desires to be met with delicious concepts and delightful design.

Each of these marvelously intricate and unique artworks seamlessly combines traditional skills with innovation and creativity to express the philosophy and personality of its creator(s). The embedded electronics, interactive textiles, encoded knowledge and living fabrics produce a surprising, astounding and inspirational glimpse into our coded future, while highlighting an integrated approach to art, design, sustainability, community and culture.

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References and Notes

1. Thanks to Erica Green, Director of the Samstag Museum of Art, for her foresight in commissioning me to curate the Coded Cloth exhibition; curatorial intern Angella Mackey (Toronto); and, at ANAT, Communication Manager Amanda Matulick and researcher Warren Veljanovski, who significantly contributed to the ideas discussed in this text and the realization of the Coded Cloth exhibition.

2. Gina Matchitt's *Tukutuku* project, although part of Coded Cloth's original curatorial plan, unfortunately could not be installed in the gallery. It is good to be able to reunite the work with others that resonate with it.

3. Nigel Borell, "E kare, You're So Colonised!" 2007, <www.marynewtongallery.com/exhibition.php?pageid=exhibition&exhibition_id=68>.

Donna Franklin, (left) *Fibre Reactive*, orange bracket fungi (*Pycnoporus coccineus*), silk organza, Perspex, wood, 198 × 75 × 75 cm, 2004; (right) detail.(© Donna Franklin. Photos: Robert Firth, Acorn Photography.)

FIBRE REACTIVE

Imagine clothing that grows with you. *Fibre Reactive* is uniquely a living garment. By its very existence, the dress incites debate over the controversial manipulation of living entities as a commodity—nature as a new interface. Artists use many different artistic tools; this work uses microbiology. *Fibre Reactive* is made of the fungus *Pycnoporus coccineus,* otherwise known as orange bracket fungus. The dress is initially supplied with nutrients that replicate those found within the fungus's natural environment, thus rendering it reliant on technology and human intervention to survive.

New technologies greatly impact cultural construction. They rapidly shape our understanding of reality, identity and interaction with the environment. As a species, humans have separated themselves from the immediate experience of the natural world through technology. Through intervention we have constructed a "cultured" experience of nature. It is the intention of this work to rupture the meaning of garments and their role in commodity culture and instead draw attention to our own mortality. Could a living dress be dangerous? Could it consume the human body? Or could the human body consume the dress?

DONNA FRANKLIN
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High Tea with Mrs Woo, (left) *Hidden*, cotton, silk, polyester, conductive thread and nylon ripstop, nichrome, copper, PVC, wire, NiMH rechargeable batteries, 115 × 45 × 3 cm, 2007; (right) detail. (©High Tea with Mrs Woo)

HIDDEN

Hidden is a shirt-dress that combines fashion and functionality. Inspired by travel, its design explores the appealing idea of feminine travel-wear with the useful feature of built-in heating pockets. Invisible warmth has been achieved by seamlessly integrating electronics into the garment's construction. At the current stage of the project, the soft switch and circuitry have been designed to be washable and the belt to be a removable, rechargeable battery pack. There is potential for the design to be entirely washable with newly available waterproofing innovations and technology.

The simple idea of "invisible warmth" was not easy to achieve. Although our aim was to use technology to create warmth, we found ourselves asking, *Is it necessary to use electronics and create energy to do this?* Pockets can be heated simply by the choice of any warm material, like fleece or wool. Also, existing pocket-warmer products could solve all our original design issues, being washable, detachable, convenient, invisible and reusable. Was it just a novelty, then, to create a pocket-warming dress with conductive textiles and electronics? Is it just another invention of useful uselessness?

HIGH TEA WITH MRS WOO (ROWENA, JULIANA AND ANGELA FOONG)
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URL: <www.highteawithmrswoo.com.au>

Elliat Rich, *Yala Sofa*, thermochromatic ink, digital print, plywood, Laminex, stainless steel components, upholstering materials, 780 × 540 × 2100 mm, 2008. (© Elliat Rich. Photos © Steve Strike.)

Yala Sofa

Yala Sofa is a furniture piece that blossoms in the company of others. Inspired by the ipomoea, a plant that grows throughout the central deserts of Australia, *Yala Sofa* provides an inspiring space for people to come together. The use of thermochromatic ink renders the ipomoea flowers invisible until heat from the bodies of those sitting on the sofa activates the ink and the flowers are revealed.

The ipomoea plant, otherwise known as the Bush Potato or Yala by the Pintupi people, provides a rich source of bush food for those who live in harsh conditions in the central desert. A potato-like tuber grows in the roots of the plant, and digging it up is an opportunity for socializing. The Yala plant flowers after desert rains.

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Alyce Santoro, *Sonic Sails (The Tell-Tail Thangkas)*, sonic fabric (woven from 50% recorded audiocassette tape and 50% polyester thread), 270 × 270 cm, 2008. (© Alyce Santoro. Image courtesy of the Museum of Contemporary Art in San Diego.)

Sonic Sails (The Tell-Tail Thangkas)

Many years ago, when it first occurred to me to literally weave a fabric made of sound, I began by knitting with cassette tape. Knitting soon gave way to weaving using tape as weft and cotton thread as warp. The resulting material was quite surprising. It felt like a light canvas but had a beautiful, mysterious sheen and was not at all like the loose web I had been making by knitting. I called it *sonic fabric.*

Soon the sonic fabric panels began to cause an unexpected stir. One acquaintance suggested that I take apart an old cassette deck, run the tape head along the fabric's surface and see if it would emit sound. Excitingly, since the tape's magnetic properties are maintained throughout the weaving process, the fabric actually *was* audible. In wanting to give back to the Tibetan Buddhist culture that had partially inspired the project, I enlisted the aid of hand-weavers at a craft cooperative for Tibetan women refugees in Nepal. Simultaneously, I contacted a small textile mill near Providence, Rhode Island, that specialized in working with unusual materials.

Like Tibetan prayer flags, the work I have made from sonic fabric is truly intended to radiate the good vibrations it contains out into the world. The collages of sounds recorded onto the audiotapes are one wonderful aspect of this work, and the people who have nurtured, inspired and continue to support sonic fabric have made it a truly worthwhile journey.

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Gina Matchitt, (left) ***Patikitiki I and II,*** **Tukutuku (Te Whakatohea, Te Arawa), Tukutuku patterning with plastic computer keys on board, each panel 1800 × 400 mm, 2006; (right) detail. (© Gina Matchitt. Photo: Michael Roth.)**

PATIKITIKI I AND II

Gina Matchitt in this work explores modes of communication, pondering "the old and the new." Incorporating *Tukutuku* patterning (cross-stitch weaving) found within the *Wharenui* (meeting house), a form of communication of another time and era, the artist offers a contemporary commentary on the very idea of communication. Matchitt recycles black and white computer keys as her contemporary means of exchange. Here the artist amalgamates both customary and contemporary modes to send her messages via "Tukutuku express."

Five sets of long, paired Tukutuku panels are installed into the gallery space like a contemporary cyber-Wharenui. The panels are presented in bold contrasting patterns with black and white (grey, really) setting the scene. Upon closer inspection, we find the Tukutuku patterns *Kaokao* and *Patikitiki* encrusted using computer keys that sit at differing depths. They provide a surprising textural element to the works, suggesting a sense of movement and texture.

Complementing these patterns—if you read the keys right—messages sit hidden in Matchitt's panels, whereby *Whakatauki* (Maori proverbs) offer lessons and communicate stories alluding to how customary Maori knowledge was distributed and exchanged. With this combining of the visual and the written, the artist pivots on the literal and the esoteric modes by which Maori now communicate. Rather than making comment regarding the validity of one over the other, Matchitt's panels acknowledge the importance of both.

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<http://www.marynewtongallery.com/exhibition.php?pageid=exhibition&exhibition_id=68>

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